

ACCIDENT LIABILITY AND PRIMARY PROCESS THINKING:  
A STUDY IN EGO PSYCHOLOGY

by

OELRICH NELL, B.A., M.Ed.

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## PREFACE

Serious efforts must be made to combat the high accident rate on the roads in the Republic of South Africa. The same spirit which exists in the field of medicine when there are evidences that an epidemic is beginning to take its toll, must come into being amongst those who are concerned with traffic and its problems. The public itself needs to become more aware of road safety. Many associations and institutions have been created to assist with the inculcation of the road safety ideal. The National Road Safety Council, which creates opportunities for investigation into aspects of road safety must continue to expand its sphere of influence.

The research project contained on the following pages represents an attempt to contribute to the human factor in traffic safety, particularly by making a closer study of the driver of the motor vehicle. The writer is concerned with the carnage that is caused by road accidents. His previous study of personality and particularly of the projective techniques of assessment has prompted a consideration of the problem.

The spade work for the research was done under the guidance of Professor D.Z. de Villiers, to whom the writer is grateful for various reasons. First and foremost it was a privilege to learn the value of an integrated clinical approach and secondly the wide experience of Professor de Villiers as a Rorschach technician brought subtleties and intricacies of interpretation not readily available in a text. All in all, the writer, from the start of a Masters degree spent years learning the Rorschach from this clinician.

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## CHAPTER ONE

## INTRODUCTION

The United States of America suffered 9,353 deaths and 32,355 seriously wounded during the first five years of the war in Vietnam. Yet an equal number of persons was killed on the roads in the United States during two months in 1966. A similar high road fatality rate exists in many parts of the world and South Africa is no exception. Concern has been expressed with the continued rise of fatalities in South Africa despite better roads and safer vehicles. The Honourable J.W. Rall, Deputy Minister of Transport, spoke as follows in an address at the National Road Safety Council Symposium in Pretoria:

*"Ons padongelukke mag vergelyk word met 'n bosbrand - sekerlik die grootste in ons geskiedenis. Die vlamme skiet hoog die lug in, orals ontstaan daar nuwe verwoestende vlamme....  
(Rall, 1973, p. 4)*

In 1970, 7,948 people were killed in road accidents in South Africa, whilst the figure for the same period in Great Britain where there are so many more motor vehicles, was 7,501. During the last 20 years the number of road accidents, where death has occurred, has increased eight-fold.

Such an accident rate has serious repercussions on the personal, social and economic spheres of life. It causes a tremendous strain on the remaining manpower of the country,

particularly when in many instances the fatalities are young people. In other accidents they are lucky to escape with their lives. A symposium conducted by the South African Neurological Society in Cape Town in 1969 was told that about 70% of young people injured in motor accidents received serious head injuries.

Driving is a form of human behaviour which in a given society is subject to self-imposed limits to activity. Normal people are usually also normal drivers, reasonably accident free with an inner control over their behaviour that is adequate. Concern exists for those individuals who do not show adequate control, and who are thus frequently involved in accidents.

During the course of a day, many potentially dangerous situations arise. By virtue of the control which he exercises over his actions, the driver is able to avert danger. At times he must be more careful than otherwise. The types of drivers who find themselves in the potentially dangerous situations range from one end of the continuum to the other. Some are so careful and exercise such stringent control that movement becomes painful, and the others are so careless that movement also becomes painful! Because driving is such a highly complex task, drivers differ in their driving behaviour from very safe to very unsafe, or negligent.

The stability of any particular driver is largely determined by an integration of many different characteristics. Thus physiological aspects such as age, size, and sex; perceptual abilities and responses; intellectual characteristics; aspects of social interaction - all come into play when a vehicle is being driven.



Goldstein (1961) pointed out that traffic engineers have made important and substantial contributions to safe travel by the good system of roads which they have constructed. There is little, however, that can be done at the moment about the negligent or irresponsible driver. Much more must be known about the driver as a road-user.

Considerable knowledge has of course been built up about certain aspects of the driver. Thus the age of the driver has been shown to be a significant risk factor. Younger people are possibly more physically fit and might have better motor co-ordination, but older people have greater experience of life situations and a greater psychosocial maturity. Human perceptual abilities have been studied in the light of traffic system components, and improved vehicle designs have resulted from a consideration of the psychomotor functions.

The main concern of the following study will be the thought processes of the driver, and consideration of the possibility of thought processes influencing the actions of the driver.

## CHAPTER TWO

## STUDIES OF ACCIDENT REPEATERS

The review of studies in the following chapter started with a consideration of the concept of accident proneness. Whilst the concept of accident proneness has enjoyed more popularity in the past than it does now, many projects have stressed its importance as a factor to be taken into account in research. The second part of the chapter contained studies of accident repeaters, with particular attention to aspects such as control, aggression, performance on psychomotor tasks, etc.

2.1 Accident proneness

The term "accident prone" had its origins in the work of Farmer and Chambers (1939). They defined it as a personal idiosyncrasy which predisposed its possessor to have accidents. The tendency manifested itself in all kinds of accidents under many different types of exposure. The term was very well accepted and led to the initiation of a number of research studies which attempted to discover whether in fact a "malign psychological quirk" such as accident proneness existed. Kolkman (1956) said that accident proneness:

*"...is een algemeen menselijke eigenschap, alleen de mate waarin zij voorkomt verschilt van mens to mens en wel zo, dat zij in alle gradaties voorkomt, van ontoelaatbaar hoog tot onmerkbaar laag. Bovendien is dese eigenschap bij een en dieselfde mens niet constant nie maar kan zij gedurende zijn leven variëren." (Kolkman, 1956, p. 54)*

Dunbar (1955) claimed that a personality trait of accident proneness is a proven fact. She suggested that accident prone persons were impulsive, looked for short-term gratifications rather than aiming at long-term goals, were resentful of authority and had shown childhood neurotic traits. She compared a group of fracture patients with cardiac patients, and divided accidents into two groups, viz., true accidents and personality-factor accidents. She claimed that 90% of the fracture patients had personality-factor accidents, compared with 12% of the cardiac patients, whereas 10% of each group had true accidents.

Researchers have attempted different statistical methods to determine the validity of the idea of accident proneness. Three such methods were considered, viz., the percentage method; the method of comparison of accidents in two consecutive driving periods.

#### 2.1.1 The percentage method

De Silva (1951) found that 3.9% of nearly 30,000 drivers were responsible for 36.4% of the accidents over a six-year period. The Cambridge investigation (1953) gave a figure of 5% of 10,000 motorists as being responsible for 16.6% of the accidents over a seven-year period.

Lejeune (1953) reported that 5% of motorists were responsible for 47% of the 10,000 accidents over a period of four years.

It appeared from these researches that a small percentage of drivers were responsible for a large percentage of the accidents. However, on repetition of the researches, it was discovered that it was not the same group but others who caused the accidents.

#### 2.1.2 Method of comparison of chance with actual distributions

If accidents were due entirely to chance, a chance or Poisson distribution would result. A distribution that does not fit would be evidence for the occurrence of accidents that were not due to chance. Both types of distribution have, however, been found by investigators. La Grange (1965) suggested that the reason for the discrepancies could be the influence of numerous factors other than supposed accident proneness. Such factors did not necessarily correlate with accident proneness in any way.

#### 2.1.3 Method of comparison of the number of accidents in two consecutive time periods

Hakkinen (1958) studied the 4,000 accidents which occurred to 1,000 bus and train drivers in Helsinki over a period of eight years. He discovered that a comparison of the same drivers in two consecutive periods of a year each, showed correlations of 0,25 and 0,35; and in two consecutive periods of four years each,

the correlations were 0,60 and 0,70. His conclusion was that the occurrence of individual differences in accident frequency was not due to chance factors but could be ascribed to a constant personality factor, which could be named "accident proneness."

#### 2.1.4 Conclusions regarding accident proneness

Walbeehm (1960) hinted that the term "accident proneness" be accepted, but that at the same time the various kinds of proneness be differentiated. Firstly, there was the relatively constant type of proneness as suggested by Hakkinen (1958). This proneness was characteristic of a specific though small sample of drivers who regularly showed the tendency to be involved in accidents more than the average motorist. Secondly, a variable accident proneness was manifested by some motorists. For a time they showed a high involvement in accidents and followed this with a period of hardly any accident involvement. They seemed to fluctuate between two poles. Thirdly, there was an incidental accident proneness where temporary factors contributed to cause accidents. Amongst these causal factors were fatigue, alcohol, drugs, illness and worry. Schulzinger (1956) felt that some drivers were susceptible to accidents particularly when they were under great mental and physical stress. Arbous and Kerrich (1951) indicated that proneness varied from time to time depending on the intensity of environmental strain.

Walbeehm (1960) did much to preserve the term at any cost, but, in fact, accident proneness has never been conclusively demonstrated. Coppin *et al.* (1971) said that the accident proneness syndrome was inferred from the consequences of behaviour and then invoked as a causal explanation of the very behaviour it described. Eysenck (1971) has summarized the ideas on the concept of accident proneness as follows:

*"Accident proneness can be defined in many different ways, and to deny its existence at one level does not necessarily contradict someone else's affirmation at another level. Thus critics have often denied the existence of accident proneness in its widest meaning, i.e., that some individuals are more prone than others to all types of accidents, or in its most inclusive form, i.e., all or most accidents are due to a small group of people. Both statements are so obviously wrong that one suspects they are just men of straw, put up to gain a semantic victory by knocking them down.... a much more likely and widely accepted hypothesis would be that those personal qualities related to accident proneness are normally distributed in the population, with most people being neither particularly prone to accidents, nor particularly safe, but with a "tail" of very safe drivers on one side and of very unsafe drivers on the other."*  
(Eysenck, 1971, p. x)

## 2.2 Accident repeaters

It has been maintained that more would be learned about the role of human factors in accident causation by concentration on specific causes in repeated accidents. The term "accident repeater" came into being, simply as a person who has had repeated accidents. McFarland *et al.* (1955) and Suchman & Scherzer (1960) suggested that

accident prone persons in fact may comprise a limited portion of any group of accident repeaters.

Tillman & Hobbs (1949) made an intensive study of accident repeater taxi drivers and compared the frequency of their personal and social maladjustments with taxi drivers who were free of accidents. The groups had been matched for driving experience and area of exposure. They also investigated the extent to which the drivers were known to agencies such as credit collection, social welfare, public health clinics and law courts. The significant differences which they obtained, led them to the conclusion that the accident repeaters reflected in their driving, their quality of adjustment to the environment and their way of living.

Shaw (1965) set herself the task of selecting the safest and best African drivers by means of psychological testing. Her first efforts included tests on reaction time, intelligence, sensori-motor and aptitude tests. These tests did not show any significant differences between good drivers and accident repeaters. The inclusion, however, in the battery of a revised form of the Thematic Apperception Test gave an overall improvement of 40% in the quality of the newly selected drivers.

Both the above studies have achieved wide acclaim as indicative of the role of personality factors in accident repetition. Many other researches, some of which have been quoted on the following pages have a similar goal.



One of the aims of the study by Selzer *et al.* (1967) was to determine the degree of correlation between traffic accidents and 31 psychopathological variables. Persons who showed paranoid thinking revealed the highest correlation. Paranoid thinking in their case was often the precursor of angry and impulsive actions. The authors felt that the three variables, i.e., low frustration tolerance, recurrent rage or resentment and destructive or aggressive behaviour, were so commonplace as to be almost socially acceptable. The variables indicative of preoccupation with fantasy and obsessional rumination suggested the reduction in the awareness of the driver of external events. Marked affective lability also showed a significant correlation with accident repeaters.

Conger (1957) combined the clinical and experimental approach and found that his accident repeater group were excessively self-centred and indifferent to the rights of others, or excessively socio-centric. They were intensely preoccupied with fantasy satisfactions or extremely stimulus-bound; more fearful of loss of love and support; and generally less able to tolerate tension without discharging it immediately.

Marcus *et al.* (1964), in their study of accident repetition in children suggested that adaptation, a complex phenomenon, was dependent on many different aspects, such as perception, judgement, etc. The child made his adaptation in both a progressive and a regressive way, with the latter not necessarily being unhealthy. Tension levels in the child diminished his reality adaptation. Furthermore the excitability of the child's neuro-muscular system varied with congenital, maturational and environmental factors.



Where a child could not establish closeness with his parent he began to rely more and more on kinesthetic identification and various motor activities. Hyperactive motor discharge was necessary for the re-establishment of equilibrium. The authors felt that the delay of immediate motor discharge by the interposition of thought defended the individual from potential damage. In this connection it was noted that Singer *et al.* (1956) said that Freud in 1900 had suggested a theoretical linkage of delay and thought development. They felt that this relationship became the pivotal feature of his concept of the reality principle. Their study centred around the Rorschach determinant M as a measure of the capacity to delay. Many M responses indicated much motor inhibition. They also indicated that lack of perceptual control went hand in hand with the inability to restrain motor behaviour.

Marcus *et al.* (1964) also interested themselves in the shading responses of the Rorschach. They suggested that the children who had many accidents were clearly distinguished from the others in their use of dark shading. Generally the authors concluded that the accident repeaters showed more anxiety and emotional disturbance; produced more dysphoric content; showed more regression adaptive measures; and also showed a diminished perceptual field.

Quenalt (1972) gave two groups of 50 car drivers a picture test, the Shipley Abstraction test as well as the Maudsley Personality Inventory. The subjects drove in their own cars around a 12-mile route under normal traffic conditions, accompanied by two observers who tape-recorded as they drove, certain observations of the driving behaviour of the subjects, on the basis of four

drive indices, viz., the frequency of occurrence of usual manoeuvres; the frequency of occurrence of near accidents; the ratio of rear-view mirror usage to manoeuvres; and the ratio of overtaking to being overtaken. On the basis of these indices four sub-groups were set up, namely, safe, injudicious, dissociated active and dissociated passive. The word "dissociated" was used to identify those drivers who appeared to drive with an awareness of stimuli which is below that necessary for safe driving. The dissociated drivers lacked anticipation, and showed poor judgement in the traffic situations. They lacked a feeling for the consequences of their own actions. When near accidents occurred, they were far less emotionally affected by the event than the observers.

Conger *et al.* (1959) found that accident repeaters demonstrated impulsive hostility, poor reality testing, emotional lability, impaired intellectual function, idiosyncratic fantasy life, and withdrawal from interpersonal relationships.

Numerous studies have noted the aggressive tendencies of accident repeaters. Parry (1968) said that there was a tendency for high aggression, whether or not in combination with high anxiety to make for greater liability to accidents.

Selling (1941) found that accident repeaters failed to anticipate risks, were often young and drove aggressively. Raphael (1967) recounted that often aggression overflowed and became manifest in fist cuffs between drivers involved in accidents. Lorenz (1966) quoted Margolin's work with the Ute Indians, who were renowned for their fighting qualities. The rates for motor-vehicle accidents

of these people far exceeded those of any other racial group. Anti-social attitudes amongst accident repeaters were also suggested by Alonso-Fernandez (1966) and Pelaz (1966).

Whitlock (1971) has made the following remarks about aggressive accident repeaters:

*"The personality structure of those convicted of crimes of violence will often show features of aggressive psychopathy. The association of this class of personality with excessive drinking, paranoid ideation, hostile attitudes towards authority, and suicidal tendencies, seems at times to be expressed with devastating consequences on the public highway. The problem of the accident repeater and the violator of traffic regulations may in part be due to the aggressive behaviour of the psychopath on the roads."*

(Whitlock, 1971, p. 50)

Roux and Erlank (1966) said that the most important difference between accident repeaters and non-accident subjects with regard to hand and eye co-ordination tests was the fact that non-accident subject worked more speedily. During 1961 Maruyama and Kitamura (1961) tested 68 bus drivers by means of a speed anticipation test. The testees were instructed to anticipate the time a light patch would require to pass through a black wall. The light patch glided at a constant speed along a horizontal ditch on a gray screen across the testee's line of vision from left to right and then vanished behind the black wall. There was a marked difference between the mean anticipation time of a group of accident free and accident repeater drivers. Nagatsuka and Kitamura (1961) did a test called The Discriminative Reaction Test of Multiple Performance on the same testees used in the

previously quoted experiment. The test was concerned with the co-ordinative function of perception and motor reaction. The accident repeater group made more errors than the accident free group. In a test battery which included a complex psychomotor co-ordination task, Andersson *et al.* (1970) found that accident-loaded drivers showed an extreme dependence on external factors and could be regarded as extrareceptive perceivers. They had very weak inner control of behaviour. Their behaviour resembled that which characterized the early stages of the development of the individual, where there was still poor differentiation between perception and action.

Hakkinen (1958) used a battery of tests for the detection of various levels of accident proneness. The battery included intelligence and mechanical aptitude; simple motor speed and co-ordination; choice reaction time; a driving apparatus test; psychomotor personality function tests; and also a questionnaire and interview. An intercorrelation between the variables of the many tests and the accident criterion, followed by a factor analysis of the correlations showed that the tests were covering six major areas, viz., attention, involuntary control of motor function, stability of behaviour, co-ordination, simple reaction time and intelligence. Attention or the ability when confronted with a sudden stimulus, to quickly choose and perform the correct response, had the highest loading on the accident criterion. This was a conscious and voluntary ability. The second highest loading or involuntary control of motor functions was associated with hastiness, distractability and motor restlessness and was an unconscious

function. Stability and adaptability of behaviour showed relatively high loadings; co-ordination, lesser loading and finally reaction time and intelligence showed no association with the accident criterion at all.

## CHAPTER THREE

A CONCEPTUAL FRAMEWORK FOR STUDYING THE  
PSYCHOLOGY OF THE ACCIDENT REPEATER3.1 Orientation of the present study

One of the recommendations made by van Kerken (1969) on his return from a study tour overseas in connection with traffic safety was that:

*"...a direct study be made of human thought processes in order to discover the rationality of the thinking of the driver." (van Kerken, 1969, p. 48)*

The present study, during the incubation of the problem, was concerned with the idea that the rationality or irrationality of the thought processes of the driver influenced his behaviour on the road. van Kerken also suggested that the discovery of the rationality of thought was second in importance only to the discovery of the unconscious. Such statements were associated by the writer with the ego-id polarities or the ego-id autonomies of ego psychology. The thinking of the human being differs from time to time as regards the extent of rationality. Even the most mature person could be somewhat unreasonable on occasion, depending on the situation in which he finds himself. Generally, however, his mode of behaviour is rational. In other cases, those of poet or artist, for instance, some irrationality could be invoked

though the individual was mostly involved with rational thinking. Researchers have considered that this controlled irrationality was, in fact, associated with creativity. Controlled irrationality was then a special phenomenon. Usually the irrationality of thinking is controlled by the ego strength of the person. The ego strength of the individual determined the extent of his adaptability or ability to cope with reality, as well as the extent to which he could regress in service of the ego. Where there was very weak control or ego strength, the irrational thought processes would appear to gain the upper hand until, as was seen in the case of the schizophrenia irrationality, became predominant.

By virtue of the fact that perception was an integral aspect of thinking, the perception of an object by a person was also coloured with rationality or irrationality depending to the ego strength of the person. A personal perceptive sequence occurred to the writer which is repeated here to illustrate what prompted further thinking about the project.

The writer was travelling by car down a relatively steep hill and wished to apply brakes to slow the vehicle down. On application of brakes there was no result, and the pedal lodged against the floor of the car. The expected result, namely slowing the vehicle down had not been forthcoming. There had to be some different action to stop the car and this depended on the quick thinking of the driver.



The lack of brakes resulted in a negative input of information and a mental regulation had to be made. The question that occurred to the writer was whether all drivers made equally effective regulation; when results were not as expected; whether archaic material or irrationality filled the mind during the absence of feedback; and finally, whether the archaic material was of the same degree for all drivers.

How could a person discover something about the thinking of a driver who did not make the most effective regulation? Could the Rorschach be an instrument to be used to discover this? The Rorschach itself, represented a somewhat similar situation in that the sensory elements of perception were minimized, during the administration of the test and imaginal elements were brought to the fore.

The preliminary thinking about the research could then be summarized as follows: A driver, at the time of minimized or negative feedback, could make an adequate reaction depending on the extent that his thinking was rational.

### 3.2 Consideration of aspects of ego psychology

Lindzey (1958) pointed out that any attempt to assess behaviour must give consideration to cognitive factors or ego processes. Different individuals in the same situation will behave quite differently depending on the way in which they



control or direct their thinking and therefore the expression of their drives. The following chapter was devoted to an understanding of different aspects of ego psychology and relationships discernible between ego psychology and the concept of feedback. In the first place, serving as an introduction were some important contributions in the development of ego psychology as well as a description of structure and function in ego psychology. A description of the primary process function followed with consideration given to aspects of secondary process thinking as being at the opposite pole. The theme of the research that the amount of feedback also indicated the amount of secondary process thinking preceded a review of the different types of feedback.

### 3.2.1 Important contributions to the study of ego psychology

#### (a) Freud

Early in Freud's writings the ego was no more than an independent agent of external reality or an organ of the self-preservation instinct. As such it had independent instinctual energy and was innately antagonistic to the drives. With the introduction of the concept of narcissism, Freud came to see the ego as a libidinal object and self-preservation as a libidinal motive. The ego was no longer antagonistic to the libido but in league with it. Freud still, however, retained the idea of the independent

status of the ego. In 1915 he began to see aggression as a property of the ego. The aggression was expressed when the ego was threatened. The appearance of self-destructive impulses soon persuaded him, however, that aggression was not basically ego-protective. By 1923 he had given up the idea of an independent reality ego. In doing so, however, he was concerned that the id again became the stronger force. Right to the time of his New Introductory Lectures (1933), the ego was still in the service of the id though its better knowledge of reality and its control of the pathways of attention, memory and action did allow it a measure of action. His final assumption was that ideally the ego and the id are indistinguishable and that their aims coincide without there being any concession from either system.

(b) Hartmann

Spitz (1957) speaks of the contribution of Hartmann as being the next major advance in psychoanalysis. Whereas Freud had systematized the knowledge of the unconscious, it was Hartmann who brought system into the fragmentary aspects of the ego. In contrast with the idea of Freud, that the id is older than the ego, he suggested that both the ego and id differentiate out of the matrix of animal

instinct. The instincts of the animal find their equivalent in the ego and drive functions of man. Inherited ego characteristics and the complex interaction of instinctual drives and outer reality both play a part in the development of the ego. The inherited ego characteristics, or inborn apparatuses of ego autonomy, include perception, intention, object comprehension, thinking, language, recall phenomena, productivity, motor development, maturation, and the learning process. He enlarged on the original concept of drive by giving a more central role to aggression. The aggressive energy participates in the development of psychic structure, and when these structures are well formed they provide aggressive energy with modes of expression. Whilst the id was usually thought of as being stubbornly opposed to change, and the ego as being flexible and able to learn, Hartmann (1952) indicated that changes in the id can be brought about by maturational development of the drives. Sometimes the ego helps to provide change in the id by draining or damming up instinctual energy. When factors occur which increase drive autonomy, ego autonomy decreases accordingly. Hartmann suggested in *Rational and Irrational Action* (1947) that ego and drive autonomies are basic to many branches of science. He made the remark that psychoanalysis might one day add a theory based upon the knowledge of the structural aspects of personality and its motivations. Hartmann

maintained that anticipation and delay of gratification were important aspects in human action. Action is an ego function which promotes adaptation to reality, especially to the extent that it is rational action. Spitz (1957) correctly alluded to the work of Hartmann as emphasizing those processes through which the species achieves the dignity of the human being. His pointers to the future, particularly in terms of theory of action and adaptation are significant for this study.

(c) Rapaport

Rapaport (1951) recognized the id forces as well as the ego organization which is pitted against them. The autonomous ego structures are responsible for everyday behaviour which shows consistency, reliability, and relative lack of intensity, whilst the id forces instigate abandon and wilfulness. Rapaport (1959) also referred to the aspects of behaviour that are delayable, bring about delay or are themselves products of delay. This delay does not just mean the lapse of time between impulse and action but a long circuiting of impulse so that the impulse is brought into harmony with realistic considerations. The unconscious impulse is constrained from discharge in order to allow for the appropriate understanding of and reaction to the reality situation. For Rapaport achievement of maturity comes via ego

independence and cognitive control or delay of impulse, but at the same time man is protected from slavery to environmental stimuli, by the fact that he has endogenous drives. Rapaport (1960) explained that id drives are created by visceral hungers which stimulate the nervous system to carry out consummatory activity until satiation is reached. In its turn, the insistence of the real world helps to protect the person against these inner instinctual pressures. He explained this reciprocal relationship in the following way:

*"Since reality relations guarantee autonomy from the id, excessive autonomy from the environment must impair the autonomy from the id; and since drives are the ultimate guarantees of autonomy from the environment, an excessive autonomy from the id must impair the autonomy from the environment." (Rapaport, 1958, p. 24)*

He carried on this line of argument and made the point that maintenance of autonomy in relation to the id or to the environment depends on input from the environment or from within the psychic apparatus. He called this input "stimulus-nutrient", adapting the term from Piaget's idea of aliment. He maintained that the structures are dependent upon such nutriment or stimulation for their stability.

(d) Erikson

Erikson did not find inevitable opposition between ego and id, nor did he make any strong appeal to ego autonomy, (Rapaport (1956) suggested that Erikson's "organ modes" are examples of autonomous ego functions and also that estrangement of the modes from the zones of origin are parallels to ego-id differentiation.) He consistently transcended distinction between ego and drive. Where to Hartmann, for instance, the drive fragments or breakdown of instinctual patterns is blind and wilful, to Erikson these fragments in themselves are synthesis-seeking. He does not feel that ego functions should be independent of the emotions and thus completely mechanically accurate.

(e) Beres

Beres (1972) wrote that the child was born with the potential to develop ego, id and superego functions. Some of the ego functions have originated from identifications with the parents and from conflict situations. They achieve a degree of independence and maintain stability in later conflict situations. Other of the ego functions lose their autonomy and regress to an earlier functional state.

Beres does not accept the idea of absolute autonomy at any stage of life and suggested that normal psychic functioning includes the capacity to use defensive measures in time of stress. The concept "regression in service of the ego" was explained by Beres as a transient loss of autonomy. In more traumatic experiences it might take years before an autonomy is restored. He mentioned too that there is the possibility that ego functions could have a definite instinctual component. This instinctual component can cooperate without conflict in a ego-autonomous way.

### 3.2.2 Structure and function in ego psychology

The content of the mind is limitless and endlessly varied. Content may be shared by different individuals for different reasons and it may fluctuate markedly within a single individual over time. In contrast to content, structure is limited to a certain number of genotypic terms. Structures should have some different implications for behaviour to simple content properties. Psychoanalytic study is based on the clinical observation of conflict in human mental activity. Such conflict presupposed opposing systems or organizations which embody the conflicting forces. Whereas initially his theory suggested that the conflict was between the unconscious

and preconscious system, latterly Freud changed this.

He said:

*"We shall have to substitute for this antithesis another, taken from our insight into the structural conditions of the mind - the antithesis between the coherent ego and the repressed which is split off from it." (Freud, 1923, p. 17)*

Just as Freud changed his views of the structure of the mind, so other psychologists have not been able to agree, as to the need for structure. Hartmann (1959) summarized the implications of structural theory as the recognition of the relevant differences between instinctual tendencies which strive for discharge and other tendencies that enforce postponement of discharge and are modifiable by the influence of the environment.

Bieri *et al.* (1960) have indicated that the more complex the structure the more differentiated it is. Within the complexity are the primary and secondary process thinking functions. They follow very closely the demarcation of ego and id though Gill (1963) has hinted that certain primary process functioning has been attributed to the ego. Kris, (1935) suggested, in a different way, that the ego retains control over some primary process thinking as, for example, in wit and creativity. The whole process of adaptation is



very complex and there might be continuous organization and reorganization of mental process.

### 3.2.3 The development of the primary process function

Freud introduced the term "primary process in his Project for a Scientific Psychology, prepared in 1893, but not published until after his death along with his letters to Fliess (1954). The section in the Project is entitled "Primary process; Sleep and Dreams". He next discussed the primary process in the Interpretation of Dreams in the section entitled "The Primary and Secondary Process: Repression" (1900). He briefly returned to the idea of primary and secondary process from time to time, the most important single paper being "Formulations of the Two Principles of Mental Functioning" (1911). The general idea given by Freud in these papers was that the primary process function was a primitive one, working very directly according to the pleasure principle. Primary process thinking manifested itself in impulsive and random action; this being that type of action that did not take into account means or reason. It was action that could easily be accompanied by uncontrolled and violent affect, or with compulsive ritual. Shafer (1958) suggested:

*"The primary process which is genetically and formally the more primitive, operates with unneutralized drive energies, and its regulative principle is tension reduction; it strives toward the immediate discharge of energy accumulations by a direct route and through the mechanisms of displacement, condensation, substitute formation and symbolization."*

(Shafer, 1958, p. 123)

Though the average reader of psychoanalysis does not affix very great importance to the concept, an authority no less than Jones (1953) regards the primary and secondary process concept as Freud's most important claim to fame.

Milner (1958) indicated that apart from the mention, as shown above, of the primary process, there has been little further exploration of the formal organization of the unconscious. It was not until fairly recently that there has been any desire to elaborate on this concept. Arlow (1958) proposed that the restricted definition of the primary process be abandoned, and that there be further study into the concept so that it might have more practical worth in the application of psychoanalytic theory.

Equivalent to the short-lived thinking in connection with the primary process, was the postponement of elaboration by Freud of the concept of the secondary process. Secondary process thought function was

considered as standing in contradistinction to the unbounded and undirected mobility of the primary process function. It arranged for ordered thought, controlled effect, and goal-directed behaviour. The rationality of the secondary process was more economical with regard to psychic energy when compared with the high intensity discharge of the primary process. Koch (1959) recorded the following of the secondary process:

*"...the structures, by raising the discharge thresholds of drive energies, and by building new controlling dams, obstruct the tendency toward direct discharge, enforce delay and detour, and thus give rise to derivative motivations whose tendency toward immediate and direct discharge is decreased."*  
(Koch, 1959, p. 127)

Klein (1954), Holt (1956), and Noy (1969) have continued the study of primary and secondary process thinking. Whilst Freud had regarded primary and secondary process functions as two different kinds of mental functions belonging to two different systems, viz., conscious and unconscious, Klein (1961) wrote that the two levels of primary and secondary organization are only two extremes of a continuum which follows from the inhibition to the disinhibition of mental functions. Holt (1956) specified that pure primary process thinking or pure secondary process thinking did not exist as such. His scoring categories in his measures for primary process thinking

were, for instance, at a level 1 and level 2 for primary process, where level 2 implied that the level 2 response was more in the direction of socialized thinking.

There is nothing in the classical approach to suggest that there was any form of development in the primary process function. Freud assumed that the primary process thought operated until superseded by secondary process thought. Primary process thinking was regarded as discontinuous and became less evident as the person developed. Where Kris (1952) used the concept "regression in service of the ego" he presupposed a situation where the strong and healthy ego reached into the deeper more primitive layers of the unconscious to obtain a greater originality of response. As this might occur at any time in the life of the person, primary process thinking always remained. Holt (1967) assumed a development in primary process thinking by the same experiences and by the growth of the same structures that produce successive versions of the secondary process.

Noy (1969) illustrated the development of the primary process function, firstly, by saying that the dream material of the three-year-old is of a different nature to that of the adult; and secondly, that the concretizations of the schizophrenic show a higher level of thinking with increasing age.

Both Klein (1958) and Noy (1969) referred to the Piagetian views of thinking. In the consideration of behaviour as development, there is corroboration between the drive aims and accommodation. They agreed that the sucking reflex or the active sucking schema is entirely subjective. There is no existence in its own right of an object that is connected with sucking. Freud (1950) indicated that the child's first erotic object is the breast of the mother, and love in its very beginnings attaches itself to the satisfaction of the need for food. Piaget (1952) propounded the idea that psychological reality in the beginning of life is the product of simple actions and their feedback. Abstract thinking slowly develops from the earliest sensori-motor activity. Noy (1969) suggested that these first experimental units or schemata are the first cognitive units which later develop and unite to create the "self" as an entity which is separate from the environment. He suggested that the first schemata might be given the name of "self-nuclei" and he defined the primary processes as functions which assimilate any new experiences into the framework of the gradually developing self. Primary process thought was the initial attempts of the immature infant to organize his perceptual world.

The primary process model is very important at this stage for the establishment of a self behaving according to tension-reduction and various defences are set up against the intrusion of too much reality. Elements of thought exist in a condensed or concentrated form. Displacement occurs where one thought element can suffice for another. The third type of defence, that of symbolism, was explained by Fenichel as follows:

*"Primitive symbolism is a part of the way in which conceptions are formed in pre-logical thinking: comprehension of the world radiates from instinctual demands and fears so that the first objects are possible means of gratification or possible threats; stimuli that provoke the same reactions are looked upon as identical; and the first ideas are not sums built up out of identical elements, but wholes comprehended in a still undifferentiated way, united by the emotional responses they have provoked." (Fenichel, 1946, p. 48)*

The inner maturational aspects of the individual and the influence of his environment begin to demand firstly that self-directed pleasurable activities be delayed or discarded. Accordingly room is made for a consideration of reality and for communication with other human beings. Outer reality is recognised to the degree that the inner representation of body schemata are perceived as being different from the outer objects. Secondary process thinking is given

impetus when the meaning of the object lies not only in its function, its appearance or its utility to the subject, but also to "mastery" of the object. In other words a double stage is reached. There is an encounter with reality and with it a working-through in a logical manner of the reality. In this way concepts are formed which are bound by time, space, and logic. Noy (1969) said that the primary process knows no such language of time and logic.

#### 3.2.4 Feedback as a criterion for secondary process thinking

Rapaport (1967) wrote:

*"...all thought forms involve both primary and secondary process but differ from each other in the kind of synthetic function they involve, that is to say, they differ in the degree of dominance the secondary process achieves over the primary."*  
(Rapaport, 1967, p. 843)

Every person has his own pattern of thought process organization which is a combination of some primary process thinking which uses visual and other sensual images, and conceptual, abstract thinking which makes use of linguistic signals, symbols and signs for mental operations. The extent to which each is included depends on various environmental and motivational factors. Weisberg and Springer (1961) found for



instance, that creative children were raised in families which tolerated illogical communication significantly more than did control families. Their work assumed that creativity involved the use of more primary process thinking than non-creativity.

Wynne and Singer (1963) recorded that parents who were not able to respond to logical communication because of their psychopathology, have children, who have learnt that logical thought processes were not efficient for dealing with their parents, and had then to adopt other forms of communication to reach them. The non-logical noises, that a father would make to his child to convey to the child the concept of a train, would be an equivalent analogy. In this case, there is an appeal to the experiencing of the "thing" meaning or representation rather than to the "word" representation. The use of the word "train" would indicate conceptual thinking or secondary process thinking. Piaget (1937) considered that clear inner representation of the object became apparent at the age of sixteen months. When the ability to discriminate between inner and outer information, or between the self and reality comes about, then feedback can take place.



Noy (1969) wrote that feedback was:

*"...a mechanism which involves perception of stimuli stemming from one's own functioning." (Noy, 1969, p. 170)*

Both feedback and secondary process occur consciously. He took walking and talking as examples of conscious functions and suggested that perceptual feedback information called the attention of the consciousness to something like a stumble of the feet or a slip of the tongue. The recognition that something had gone wrong, caused an attempt at immediate restoration. Noy (1969) further defined feedback as:

*"...the continuous inflow of perceptual information stemming from all the elements involved in a given function, or from special receptors located in a given system to provide this information (for instance, the carotid sinus in the cardiovascular system). This information serves to monitor and regulate the given function." (Noy, 1969, p. 163)*

He explained that in many somatic functions the monitoring is done automatically with the aid of basic or conditioned reflexes, whilst in the higher mental function it is done with the aid of awareness or calling the attention of the consciousness where it is necessary. Klein (1958) indicated that feedback was significant because it co-ordinated the phases of perce-

ptual-cognitive-motor action and reaction with drive aims on the one hand, and with the environmental structures and probabilities on the other hand. Troland (1932) spoke of concept of "retroflex" which involved a back action of the environment on the cortex. He said that changes of behaviour provoked by contact with segments of reality are themselves perceived, and the consequences of the contact can be reported back to the cortex in terms of benefit or injury, leading to reinforcement, facilitation or inhibition of the behaviour change.

The secondary processes have been regarded as the thought function that develops in relation to reality. The secondary processes also depend for their maintenance on reality contact. Goldberger (1961) concluded that:

*"...the psychic structures underlying the operation of logical, reality-orientated thought require continual sensory contact with the order and patterning of the real world, which the thought process is epistemologically assumed to reflect. In the absence of such contact, the psychic structures lose their stability and drive-controlling capacity, with the result that regression to the primitive, archaic, primary process mode of functioning is facilitated." (Goldberger, 1961, p. 289)*

Noy (1969) also considered the role of the primary process thinking in connection with feed-

back. He suggested that in many situations primary process thinking is not really unconscious, but partially conscious, or at least their product is conscious. He categorized primary process thinking into four different categories. In the first the subject is unaware of his behaviour and of the process that determines it. A trained observer would recognize that such product-process unconsciousness is found in the behaviour of a neurotic or psychotic. In the second, as in the case of the remembered dream, the process is unconscious, but the product conscious. In the third, as in the slip of the tongue, process is *ex post facto* conscious and product is conscious. In the fourth, as in the case of jester or poet, both process and product are conscious and controlled. Consciousness is the means of regulating the primary process in terms of reality. The author pointed out that in the case of primary process thinking, feedback served to prevent such processes from hindering reality-oriented thinking, or integrated them into reality-oriented thinking.

### 3.3 A review of the concept of feedback

The simplest explanation of the idea of feedback was given by Bilodeau & Bilodeau (1962). They called it the knowledge of results and suggested that to know what one has done

was easily the most important variable which controls learning and performance. In an experiment (1960) they showed that there was no improvement in performance without some knowledge of results; that there is progressive improvement with knowledge of results; and deterioration after withdrawal of knowledge of results. Conklin (1959) showed that performance was seriously disrupted or made impossible by lags in feedback of even one second or less. Ammons (1956) suggested that the word "feedback" has posed problems, and that it has been used in many different contexts. The different ways in which feedback might occur, have been described below.

### 3.3.1 Serial chain feedback

Greenwald (1970) gave the following example of feedback as it exists in the performance of a routinized series of responses. In a musical melody, the first performance is usually guided by situational cues such as the written notes of the melody. As the performance becomes more reliable, playing a note is consistently preceded not only by perception of these situational stimuli to which the performance is already conditioned, but also by the reception of stimuli produced by the performance of the preceding series of notes, or in fact by the sensory feedback. These latter stimuli could be auditory, visual or proprioceptive in different types of situations. Whatever their form,

first there was a tendency to overshoot, and when the light was moved back to ten degrees, there was a tendency to undershoot the mark. In Pew's (1966) experiment, subjects attempted to keep an oscilloscope target centred on cross hairs by sequentially pressing two keys, one of which caused target acceleration to the right and the other to the left.

After much practice, the best subjects were making approximately four or five responses per second. Although the rate of responding was close to the limits for processing visual feedback, the pattern of responding suggested that rather than modifying each response on the basis of feedback, the subjects were modifying a motor programme. It was noticed in these experiments that movement control was internalized and it was quite possible that for short periods of time there was freedom from visual control. Kinesthetic feedback was maintained throughout.

### 3.3.3 Ideo-motor mechanisms

Mowrer (1960) pointed out that William James (1890) anticipated present-day developments on feedback. In a chapter about "Will" James suggested that sensory feedback from action was essential to the continuation of such action, and even the initiation of such action.

The principle underlying the ideo-motor mechanism was that the image of the movement was active prior to the performance of the movement. Images of imminent movements had been built up during the myriads of learning experiences through life. The child, for instance, spent many hours viewing the movements of his hands, hearing the sound of his voice, etc. As life proceeds novel input might provide for more flexibility of performance or for the planning of a response. Greenwald (1970) suggested that the ideo-motor mechanism assumes that responses are represented in the form of images of their consequences.

There are different bases of evidence for the ideo-motor system. Luria (1961) in his work on developmental investigations of voluntary regulation of performance, found that the child developed increasing verbal control between the response image and overt performance. At three years of age, for instance, with repeated instructions, a child can squeeze a ball on the presentation of a red light and inhibit squeezing on the presentation of a green light. At the age of five, he becomes able to use his own speech to inhibit responding, as well as to regulate performance at a variety of other complex tasks. Max (1937) found correlations between the thoughts of movements and the electromyogram recordings of movements of the effectors.

Greenwald (1970) indicated that the ideo-motor system dealt with symbolic mediational processes and not with a direct linkage of response to stimulus. It was therefore not a rigid system with one-to-one relationships. Such a system would be adaptable enough to account for the role of ideational processes, at the response image, or the most abstract levels in planning of novel action sequences.

#### 3.3.4 Orienting responses

Sokolov (1958) and Berlyne (1970) have given prominence to "internal mediating responses" which they have called "orienting responses". The orienting responses produced changes in the body which could not be detected without special instruments. The orienting responses appeared to increase the capacity to obtain feedback from the environment. When such an orienting response came into action, it was accompanied by increases in the sensitivity of the sensory equipment as a whole, and it also prepared the organism to act more rapidly and vigorously. Zaporozhets (1970) indicated that feedback is most important in voluntary behaviour. He said that there is a difference in the amount of feedback that occurs in primitive behaviour and complex behaviour. In primitive behaviour some feedback is obtained at



the end of the behaviour pattern. With complex behaviour, there is a continuous monitoring of the behaviour and visual, auditory and proprioceptive stimuli are used throughout. The greater the amount of feedback the more flexible the behaviour.

### 3.3.5 Feedback and ego psychology

Ego psychology presupposed an active organism with many incoming stimuli pressing for change in activity. Klein (1969) wrote that at the moment of the occurrence of the incoming stimuli an area of imbalance existed at a particular event region of an ideomotor system. The excitation or the increase of excitation at such an area gave rise to a train of thought. The train of thought consisted of a structure within which a temporary extended series of events was linked at the receptive end via exteroceptors and visceroreceptors to stimulation; at the motor end to affector and effector processes; and to each other by facilitative or inhibitive signals in a patterned sequence. The area of imbalance is an internal regulator which sensitizes the person to stimuli and leads to information-producing actions. The imbalance gave rise to motivated behaviour which had as its purpose the inhibition of primary stimulation and the selection of feed-



back from the environment of affective, ideational or action types which might lead to consummatory activity.

### 3.3.6 Feedback delay

Whether feedback be visual, auditory or kinesthetic, there is the possibility of a very small but finite interval from the time of the response to the time of the feedback. Feedback delay has been noticed in life situations and it has also been simulated in experimental conditions. Tracking is one such situation. Tracking is the steering motion in following something along a given path. To keep to a given target requires constant visual regulation. Sensory feedback mechanisms prompt the operator as to his position on the target, and cause him to make the necessary adjustments. The introduction of a delay in between the activity and the feedback tends to change the intrinsic organization of the motion pattern thereby permitting the entry of disconcerting effects. When a machine to be steered is too heavy for easy and direct manipulation by a human operator, a power system is sometimes introduced to enable the operator to control the machine efficiently. Unless delay is reduced to a minimum, the tracking performance is affected adversely. The

driver of a big bus could easily be an individual who is more than usually perturbed by feedback delay.

### 3.3.7 Experimental findings involving feedback delay

Smith (1962) has pointed out that remarkable consistencies have been noticed in experiments on delayed feedback. He said that a delay as small as a few hundredths of a second causes severe disturbance or breakdown of normal movement integration with an accompaniment of emotional disturbance. Kalamus *et al.* (1960) found that duration of handwriting movements was approximately a linear function of delay magnitude up to 0,5 second. In tracing tasks, the magnitude of delay was more correlated with error scores than with movement duration. Subjects showed no learning effects during delay. Van Bergeijk & David (1959) found an increase of neatness and error scores exponentially with increasing delay intervals. Smith (1962) in a delayed pictorial feedback experiment found that the subjects displayed emotional disturbances with all delay intervals. Accuracy of performance decreased. Smith *et al.* (1960) reported that in a second delayed pictorial feedback experiment that they found a marked slowing down of movement; blocking and disorganization; repetition of movements; and changes in motion patterns.

The role of kinesthetic feedback as adjunct to visual feedback was also explored. Poulton (1952) showed that if subjects closed their eyes for a five second period while tracking a sixty cycles per minute input, tracking was often maintained as well as when their eyes remained open for a five second period. It appeared from this that movement control could be internalized for short periods of time with freedom from visual control. The same cannot be said for kinesthetic feedback. Howard and Templeton (1966) specified that kinesthesia included the discrimination of movement and amplitude of movement of body parts, whether these were actively or passively produced.

Work has been done to show the importance of kinesthesia in the control of movements by blocking the kinesthetic cues. Lazlo (1966) found that loss of kinesthetic sense resulting from ischemia, is detrimental to tapping. Gibbs (1965) suggested that when subjects were required to make rapid movements in the opposite direction to step function signals, they occasionally started the movement in the wrong direction. Early in practice the mean time to correct was only .11 sec. The implication he made was that the latter time was too fast for visual correction and was in fact due to kinesthetic correction. A study by Notterman & Page (1962) compared two types of tracking. There was

performance with a moveable control stick having various degrees of elasticity, viscous damping and inertia on the one hand and performance with an isometric control in which elasticity, damping, and inertia were computer-controlled constants. The relation between the force of the operator on the control and the oscilloscope output was the same in both cases, but with the moveable control, the operator had kinesthetic feedback arising from the movements as well as the force. It is interesting to compare the aspects of feedback involved in this experiment with the use of the gear lever in the motor car. It was the opinion of the writer that the kinesthetic and auditory feedback in changing gears with a gear lever, clutch, and pedal would be advantageous to certain drivers who resort to primary process thinking more quickly than others. Fitts (1951) stated that visual control was important whilst a person was learning a new task, but as performance on the task became habitual, it was likely that proprioceptive feedback became more important. Fleischman & Rich (1963) continued experimental work on the idea of Fitts. Their conclusion was that kinesthetic proficiency is predictive of more advanced levels of psychomotor performance. They maintained that spatial-visual cues provided initially such information which guided the movements of the subject into appropriate patterns. In the initial stages the subject had

little opportunity to experience kinesthetic feedback as his errors remained large ones. Up to such a stage there had been more emphasis on spatial relationships as regards the control handle and the direction of the handle movement required to move the target follower toward the target. Once a given level of proficiency had been reached and the errors had become less, the spatial cues were no longer so important. To achieve higher scores finer motor adjustment was required. Those subjects who were more sensitive to proprioception cues made good preliminary use of the spatial-visual cues and eventually became the more proficient type of subject. Undoubtedly one type of feedback complements another type in the assistance they give as regulators of activity.

There have been attempts at the reduction of kinesthetic feedback during an experimental situation. Chase *et al.* (1961) placed vibrators on the arm of a subject who had to perform a key-tapping task. It was possible in this way to distort the decoding of proprioceptive information to the central nervous system. However, the extent of the reduction of feedback by this process was questionable. Provins (1958) found a small decrease in isometric finger oscillation as a result of xylocaine nerve block. Again the result was not very conclusive, because only skin and joint

receptors were anaesthetized and muscle and tendon receptors remained intact. In another experiment by Lazlo (1966) where nerve compression was applied, it was found that there was a pronounced performance decrement in the absence of kinesthetic feedback.

Klein and Wolitzky (1969) diminished the feedback from the speech of a subject by masking it with white noise transmitted by earphones. They found disrupting effects, which produced an increase of drive-related content into thought.

Goldberger (1958) carefully screened male college students who were then isolated perceptually. They spent eight hours in a semi-soundproof room, with hands in cardboard gauntlets, eyes capped with translucent halved ping-pong balls and ears covered with padded earphones through which white noise was piped. Those who adapted best to the situation were not threatened by their primary process thinking. Goldberger (1958) felt that the more disturbed the student was by primitive perceptions, thoughts, and drive expressions in the Rorschach test, the more likely he was to react with unpleasant affect to sensory deficit.

Murphy (1953) put field dependent and field independent subjects under conditions of partial sensory

deprivation. Subjects were told of the schizophrenic-like hallucinations that they might expect to experience. Field dependent but not field independent subjects showed a significant drop in mature function.

Klein *et al.* (1955); Smith *et al.* (1957); and Bach & Klein (1957) presented evidence about sensory reduction of "gating" as it has been called by Bruner (1957). They employed the technique of producing a subliminal stimulus by exposing two stimuli briefly and in rapid succession so that only the second of the pair can definitely be seen. It was found that the consciously seen form - the second of the pair takes on a different appearance in certain respects.

#### 3.4 Perception and cognition in relation to personality

Perception of stimuli from one's own functioning has been equated with feedback and shown as necessary for secondary process thinking. Other studies have taken up the relationship between perception and motivation.

Klein (1958) said:

*"...therefore the concept of accurate perception can be especially mischievous if it leads us to assume that there is a finality to perceptual development, a plateau in what can be seen. Perception pursues meanings, not exhaustive accuracy or totality." (Klein, 1958, p. 104)*



The above statement reflected the earlier views on perception. The perceiver was regarded as a passive camera-like recorder of the field which was impressed on him. Klein and Schlesinger (1949) correctly asked about the place of the perceiver in perception. Hall and Lindzey (1957) stated in their review that perception implies a perceiver and each perceiver is a complete being with his own individual personality structure and characteristic manner of functioning. The personality structure of the person dictated then, his manner of perceiving.

Witkin (1962) attempted to relate certain modes of perceiving to general types of personality. In the study of field dependence - independence, he indicated individual consistency in response to an embedded figures test, a rod and frame test, and other tests. Gardner (1962) pointed out that Witkin's experimentation first and foremost sampled individual differences in the capacity to attend and respond selectively to relevant cues. Young (1961) said that the characteristics that were ascribed to the field dependent and independent subjects were indicated particularly on the Rorschach test.

Not only is perception dependent on personality but Klein (1956) felt that perception could assist in understanding the link with personality in integrated activity. Perception for him was part of a larger adaptive act. He planned a perceptual





model<sup>1</sup> which predisposes perception to motivational aspects to a greater degree than any writer before him. A sequence explained the occurrences in the individual from the time he planned the perception until the time that he acted on it. At the beginning of the sequence, there was an intention, hypothesized in the form of a hierarchy, consisting of a dominant aspect and aspects which became more peripheral. At each level of the hierarchy the intentions became less consonant with the dominant intention until those at the outer most fringes were completely non-adaptive and irrelevant. Next in the sequence, which could also be regarded as the reconstruction of those aspects of the external reality which coordinated with the perceptual intent, was the phenomenal image. Again there was a hierarchy with certain qualities which were very relevant to the intention, at the centre, then others, which could be brought to awareness, then others which were disconnected and unconscious. Images, for instance, aroused by an unconscious voyeurism might form an apt representation, in a particular form of object. At the final stage of the sequence the percepts were translated into acts of communication, or discharge in fantasy or imagery, or some manipulative action upon the object-field. Klein mentioned that:

*"The effects of motivational participation may be seen not only at various levels of response during the laboratory situation,*

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1. A detailed description of the perception model appears in McCary, J.L. (1956). *Psychology of Personality*. New York: Grove Press, Inc. 121-199.

*but in later circumstances and in altered states of awareness, as in dreams, day-dreams, reverie states, etc., when executive intentions of conscious, purposeful thought are no longer active." (Klein, 1956, p. 189)*

In the usual perceptual model, personality constants have been neglected and the emphasis has been on the perceptual process itself. A valid cognitive style which accounts for the integration and consistency of the behaviour of a person, appeared to the writer to be based on the one hand on the ego-id autonomy balance, and on the other hand, on the entry of primary process thinking and secondary process aspects on the formation of what is called the phenomenal image.

The entry of "other" motives into what is perceived, was very important for the thesis about perception which Klein wished to develop. He quoted Fisher, (1954), as having said that the experimenter's explicit instructions in the experimental set-up did not exhaust the motivational context of the experiment. There were many aspects like the significance of the setting; of the experimenter himself; the apparatus; the task itself that could activate motives at other levels. Klein (1956) himself said:

*"From these observations it is possible to say that, if intentions of the executive variety set up an anticipatory framework for focussing the subject on certain and not other attributes of the field (e.g. only upon the tachistoscopically exposed picture), so is it possible to speak also of intentions created by "more silent" motives which also compete for the total field of perceptual registrations." (Klein, 1956, p. 156)*

Since 1950 researchers at the Menninger Foundation have been engaged in investigations which have focussed upon individual consistencies in certain aspects of cognitive functioning. Holzman (1954) used the terms "levellers" and "sharpeners" to differentiate between two types of perceivers. The "levellers" appeared to develop a stable preconceived notion of the sizes of squares and assimilated their subsequent percepts to this notion rather than considering each stimulus on its merit. The extreme "leveller" seemed to have unusually limited quantities of neutralized energy for the spontaneous cathexis of new events.

Gardner (1961) worked in terms of what he called "field articulation" and hypothesized that "field articulation" appeared as selectiveness of attention, the capacity to direct attention appropriately to the significant features of the field and to disregard the irrelevant aspects. Gardner was impressed by the degree of individual consistency in his results as regards these variables.

In a large number of studies (Gardner *et al.*, 1959, 1960; Gardner & Lohrenz, 1960; Gardner & Long, 1961; Gardner *et al.*, 1960; Holzman & Gardner, 1959) the work of discovering individual consistencies in assimilation among new percepts and related memories of earlier percepts was continued. In all this work there was a characteristic emergence of enduring patterns of cognitive functioning, with definite cognitive controls that mediated the expression of particular intentions when the individual was confronted with particular stimulus conditions.

Gardner and Moriarty (1968) have also worked with what they called the "tolerance of perceptual ambiguity". This tolerance appeared in the perception of apparent movement phenomena. The more tolerant perceived apparent movement over a wider range of conditions. They showed freer imagination in responses to Rorschach inkblots. The less tolerant were less ready to perceive the distortions produced by viewing through aniseikonic lenses. The less tolerant had lower thresholds for flicker fusion. Loomis and Moskowitz (1959) showed a relationship between tolerance of perceptual ambiguity and constricted or flexible control.

Many of the studies quoted above were designed within the framework of an ego psychology. Such a framework was important because the complete understanding of cognitive structures and action following as a result of those structures would depend upon the consideration of the balance of ego and id autonomies.

### 3.5 Ego psychology and psychodiagnostic testing

Schafer (1967) suggested that the discoveries of Freud and the recent developments in ego psychology appeared to furnish the most searching and comprehensive means for understanding and capitalizing upon the Rorschach situation. Whilst Schafer had always been prominent for his attempts to relate psychoanalytic theory to psychodiagnostics, it was in his newer work that he moved away from the classical tension-reduction theory to the newer ego psychological approach. He said:

"I explain briefly my stress on contemporary Freudian psychoanalysis. This stress indicates that the ego will occupy a central position in the following remarks. It indicates that psychoanalysis long ago pushed beyond the theoretical and clinical point of fascination only with instinctual tendencies and associated primitive acts and fantasies, and the methodological point of persistent endeavour to demonstrate only the universality of these tendencies, acts and fantasies. ...Psychoanalytic theory has become progressively more concerned with individual stylistic differences in the selective control, modification, and expression of these instinctual trends. At the same time, it has become more concerned with the origins of these individual differences - in culture and in constitutional predisposition as well as in early family experiences. The study of the origins and organization of individual differences in this light is essentially the psychoanalytic study of the ego. The concept "ego" is a broad one, subsuming such varied phenomena as control of and defense against impulses, reality testing, modes of interpersonal relationship, communication, purposeful motility, creativity, and self-integrative efforts, and all the finer phenomena subsumed in turn by these, such as concentration, judgment, concept formation, and verbal and motor learning."

(Schafer, 1967, p. 15, 16)

Rapaport (1968) said that the consistent exploration of projective tests was the exploration of thought processes. It was noticed that in the projective test the unconscious makings of the thought process would occasionally become palpable but in the main, projective tests were concerned with the type of organization of thinking palpable in the course of spontaneous thought processes.

The ego psychological approach gave new opportunities to clinical testing particularly as far as the Rorschach was concerned. It came at a time when criticism of psychodiagnostics was becoming provocative. Zubin *et al.* (1965) said:

*"Projective techniques were once young and promising. Today, they are only promising. How long can they continue to promise without delivering?"*  
(Zubin, Eron & Schumer, 1965, p. 610)

At the same time ego psychology with its emphasis on the growth of cognitive functions and adaptation has gradually given psychoanalysis a new respectability. A consideration of psychodiagnostics with an ego psychological matrix could again contribute to clinical psychiatry in the form of description of normal and abnormal behaviour; dynamic interaction of mental mechanisms; evaluation of psychotherapy; and concepts of change and prognosis. Molish (1968) has said:

*"The tools afforded by experimental ego psychology are already available, by which much of the theoretical framework of projective techniques can be further expanded and refined."*  
(Molish, 1968, p. 114)

### 3.5.1 Ego psychological propositions for Rorschach testing

Schafer (1967) mentioned certain approaches basic to ego psychology which would refine Rorschach analysis. Firstly, he spoke of the interpersonal dynamics of the



test situation, or the ways that tester and patient alike, present themselves. Such presentation would include their histories and life circumstances in the sense that these would influence the manner of responding. Secondly, recognition of the regressive and counterregressive movement in the creative aspects of the response. The adaptivity of the subject allows archaic, normally unconscious and preconscious fantasies, modes of reasoning, memories, concepts and images to come to consciousness in order that they may be subsequently molded, revised, reintegrated, and otherwise manipulated by critical, reality-orientated ego functions. Thirdly, analysis of defence has been recognised as essential in psychoanalytic explanation and treatment. The defensive structure of the patient becomes very clear in the form and content of his responses. The extent of defence would accordingly impede the adaptation of the patient.

The fourth approach mentioned, centred around the concept of "ego-identity" as elaborated by Erikson (1950). In a later work, Erikson said:

*"In the individual it is the ego's task to promote the mastery of experience and the guidance of action in such a way that a certain wholeness synthesis is, ever again, created between the diverse and conflicting stages and aspects of life - between immediate impressions and associated memories, between impelling wishes*

*and compelling demands, between the most private and the most public aspects of existence. To do its job, the ego develops modes of synthesis as well as screening methods and mechanisms of defense. As it matures through the constant interaction of maturational forces and environmental influences, a certain duality develops between higher levels of integration, which permits a greater tolerance of tension and diversity, and lower levels of order where totalities and conformities must help to preserve a sense of security. The study of those fusions and defusions which - on the individual level - make for a successful wholeness or an attempted totality thus belongs to the realm of psychoanalytic ego psychology." (Erikson, 1968, p. 81, 82)*

In the Rorschach, the ego-identity of the patient is often shown in the themes which are built around a response. The four above-mentioned approaches have been utilized by Holt (1963) in his work for testing of the primary process.

### 3.5.2 Rorschach measures of primary process thinking

#### (a) Content

Schafer (1967) pointed out that responses, which, in the usual manner of Rorschach interpretation, would have appeared in different content categories might, in fact, have a common theme, such as guilt, orality, aggression, etc. Secondly, a single response might be viewed from several different angles, viz., an indication of the self-image of the patient; an indication of the interpersonal orientation; or an indication of the drive direction. Thirdly, a response might be indicat-



ive of high ego functioning and yet bizarre content in the same record. Thus Schafer (1967) gave the example of "a man with a fang coming out of his mouth" as being a response in card IX of very accurate form perception, yet of the most primitive levels of the unconscious processes.

The Rorschach has been regarded as an impersonal, ambiguous, and unstructured situation. The subject is required to produce a series of visual images from the unstructured cards. Because of the complexity of the stimuli in each card, a large number of images might be produced. Different people might produce different images for the same area. Though some of the images are more accurate and representative than others, none of the areas have any counterpart in reality. Thus the demand for organization and synthesis is there, but it is met with extreme difficulty. The unstructuredness would appear to favour the emergence of primary modes of thinking. When material is unstructured, it is also easier for fringe perceptual intent to contain unconscious wish material. Freud (1961) said that thinking in pictures stood nearer to the unconscious processes than did thinking in words. Noy (1969) had suggested that the development of a word representation instead of a thing representation implied secondary process development.

Schafer (1967) pointed out that a number of givens or constants seemed to characterize the person who took the Rorschach test. Fantasy was encouraged and according to the desire to comply, the subject regressed "in service of the ego". The fact that the subject was required to give vent to free imagination, relieved him of much responsibility for the content of his responses. Schafer (1967) said:

*"This opportunity to externalize responsibility and to ward off superego anxiety further deepens the reaches of the consciousness and tends in subtle ways to infantilize the patient's emotional position."*  
(Schafer, 1967, p. 62-63)

The test required communication of intimate, even, if not, immediately revealing material without a basis in trust in the relationship with the tester. Schafer (1967) noted that:

*"...this rude psychological intrusion by a stranger stimulates in the patient an anxious sense of violated privacy, emotional vulnerability, and defenselessness."* (Schafer, 1967, p. 63)

Baer (1950) mentioned that the very fact that there was no knowledge of the desirability of the responses, caused anxiety, uncertainty, and feelings of rejection.

All these and other tester-subject-test relationships would give rise to additional primary process thinking.

(b) Formal characteristics

Rapaport (1968) said:

*"The formal characteristics, in contrast, give information about the patient of which he is hardly or not at all aware. They indicate the function patterns of his awareness, rather than its content - that is, in what way he tends to become aware of situations, or experiences his affects, or avoids or elaborates on them. The content of a response can be controlled by the subjects, modified by speculation, or even suppressed; but the formal characteristics are expressions of perceptual organising and associative processes which are not consciously experienced and hence not amenable to conscious censorship."*  
(Rapaport, 1968, p. 284)

(c) Regression in service of the ego

Schafer (1967) pointed out that in a projective test such as the Rorschach more regression in the service of the ego is required because the subject is required to create something from an unstructured situation. The mature subject uses regression in service of the ego to respond with a wide range of forms and content. In the course of his creating something that fits in, both in terms of stimulus and situation, he establishes a distance from participation, with curious, humorous and interested expression. Distanciation helps the subject to differentiate between inner and outer. He does not have to live out the response himself, this being something which might cause him to be hostile, agitated, elated or depressed. Overparticipation causes insufficient working-out and the entry of uncontrolled archaic

material. Defence cannot be relaxed at any stage. The responses of the subject demand defence. As has been mentioned above, primary process can be expected to be found in the responses, but the ego mastery of the subject assists him to defend effectively against being overwhelmed by primitive thinking.

(d) Rorschach and delay of impulse

Rapaport (1968) has pointed out that the development of the ego and thought processes was founded on the progressive mastery over the impulses. In the case of the infant, action arises out of needs that are instinctual in their origins. These set up tensions which require release. Whilst such release is limited to a few ways at the beginning of life, development causes a variety of channels which might be appropriate for release to be established. The process of selection involves psychological process called delay of impulse. Such psychological delay is not necessarily temporal in nature. It is more in the nature of a regulation of the thought processes so that there might be an adequate testing of reality. Rapaport (1968) said:

*"In turn, these selective probings make for more and more delay of action, inasmuch as the ensuing differentiation of the psychological environment makes the search for satisfaction much more complex. Thus a kind of self-perpetuating system of probing and delay comes about, which extends its scope to wider*

*and wider areas of the person's functioning. The various methods of selective probing derive their driving power from the original instinctive source; but as development proceeds they become relatively independent of this source and are able to regulate autonomously the availability and mode of expenditure of these instinctual energies.... Thus autonomous derivatives of the original drive are built up. These derivatives are partly in the nature of ideation or thought processes, and partly more of an impulsive character like their instinctual sources." (Rapaport, 1968, p. 377)*

When regulation or delay proceeds smoothly, there would appear to be a correct balance of primary and secondary process thinking for a particular person. The nature of the balance is different for different persons.

Form responses were regarded by Rapaport (1968) as representative of the autonomy of the perceptual and thought processes from the unconscious factors. A form response, in its purest state, was completely unsullied by the instinctual aspect. This was, however, only a hypothetical state, for civilization demands that affect and anxiety form part of thinking. To practice total inhibition of impulsivity would have denied the existence of the earliest modes of thinking of the infant. Good formal logical thinking must strike a balance between undue inhibition and undue impulse. Delay of impulse was regarded as the process involved in the working out of a good form response. Rapaport (1968) said:

*"The subject's mode of functioning should allow for the delay necessary for a perceptual articulation of the inkblot, for an initiation of associative processes on the basis of the initial perceptual impressions, for a consequent reorganization of the perceptual material to obtain a congruence with the possibilities offered by the associative processes and finally for a critical appraisal of the response which came forth; otherwise the form level of the response will be poor." (Rapaport, 1968, p. 344)*

In the Rorschach system of scoring, the F+% indicated the general effectiveness of delay of impulse to obtain a good form score. Holt (1963) provided additional scores in his system of primary process scoring system to pursue a highly differentiated qualitative analysis of form responses.

In the case of the M response, there was a similar effectiveness of delay. Rapaport (1968) advanced the hypothesis that these responses were highly integrative. The person who gave M responses possessed rich associative resources with which he was able to correct the perceptual imbalance and anticipate in a flexible way a configuration other than that given in the blot. The associative resources were able to integrate many form elements and their spatial relationships into a very stable effect. Rapaport felt that for all such functioning to take place presupposed excellence in the ability to delay impulse. FM or animal responses were reported by Piotrowski (1957) to occur when there was a diminished

consciousness, lesser self-control and a lowered integration. Delay of impulse was thus less effective than in the case of M.

Finally the degree of control or delay of impulse was seen in the various colour responses. In pure C there was almost total absence of delay and a short-circuiting caused components which were usually unconscious to enter consciousness. The CF response showed only minimally effective delay with slight integration of association and perception. It was the FC response on the other hand that was indicative of a flexible control and careful regulation of the perceptual and associative processes.

Piotrowski (1957) considered degree of control from a different point of view. He said:

*"The fundamental psychological differences between cR and c'R consists in the cR indicating a deep-seated need for alleviating anxiety by a decrease of overt activity in those spheres of life which cause fears and anxiety, and the c'R indicating a deep-seated need for alleviating fears and anxiety by an increase in overt activity, particularly in those spheres of life which cause the fears and anxiety. The individual with prominent cR tends to assume an attitude of restraint and watchfulness when he feels anxious; he delays actions he considers important. Actions are delayed despite the fact that heightened excitations and awareness of the potential destructive power of the environment becomes more keen. The more numerous the c'R, other conditions being equal, the stronger is the impulse to do something overt and definite in order to*



*remove or change the anxiety-producing situation, and the angrier and keener becomes the awareness of one's personal strength. The stronger the cR, the greater is the opportunism; the stronger the c'R, the greater is the tendency to take great chances, to challenge the powerful, and to act hastily and imprudently."*  
(Piotrowski, 1957, p. 262, 263)

The shading responses were summarized by the author as referring to mechanisms of control over the outward manifestation of emotions, including manifest anxiety. The sum of c were compared to the F+%, both being regarded as indicators of positive capacity to restrain and control overt behaviour. F+% was regarded as an indication of conscious self-regulating control which did not require conscious watchfulness.

### 3.6 Aggression and its relationship to ego psychology

Selzer and Payne (1962) reported their interviews with sixty men in a Veteran's Hospital. Only one of the subjects was conscious of making a suicide attempt by automobile. The others believed that their traffic accidents were fortuitous. Menninger (1936) in his own studies, concluded that:

*"In many of these accidents...illuminating instances can be shown to fulfill so specifically the unconscious tendencies of the victim that we are compelled to believe either that they represent the capitalization of some opportunity for self-destruction by the death instinct or else were in some obscure way brought about for this very purpose."* (Menninger, 1936, p. 6)

Opposed to unconscious aggression, would be the self-preservative functions of the ego, which includes the understanding of cause and effect, and the control of dangerous wishes.

Frankl (1963) noted for instance, that self-preservation is impaired if there is a lowering of the libidinal cathexis of the self due to neglect by the mother. Accident-prone children showed a persistence of compulsive action, a turning of aggression against the self, and a tendency to act out the mother's unconscious destructive wish.

The following sections considered aggression particularly because it formed part of the measure of primary process thinking as devised by Holt (1963).

### 3.6.1 The nature of aggression

Aggression has been described as being determined either by environmental forms such as cultural conditioning (Clemente & Lindsley, 1967) or biologically (Lorenz, 1966). The fact that writers have attributed aggression either to nature or nurture, has been mirrored in psychoanalytic theory where it has been allocated to the id and to the ego.

In Freud's earlier findings (1905) about the nature of the instinctual drives, impulses of an aggressive nature were treated as components of the libido. In a

space of a decade, Freud (1915) suggested that the aggressive impulses were that part of the ego which served self-preservation. Further clarification of the structural concepts, the ego, id and superego made this assumption untenable. Hartmann *et al.* (1949) said:

*"The ego, i.e. the psychic organization oriented toward the external world, in control of synthesis of conflicts, and motility, perception, and thought could no longer be assumed to be equipped with drives of its own.... (Hartmann et al., 1949, p. 10)*

At the same time, clinical observations indicated that the assumption that aggressive impulses were only a part of a drive to mastery was not satisfactory. It seemed appropriate, Hartmann pointed out, that there should be a discrimination between various types of mastery, some of which were in part correlated to various functions of the ego; others which appeared as manifestations rather than as source of aggression. It was better to assume that aggressive impulses were manifestations of an independent, primary (innate) aggressive or destructive drive. Hartmann *et al.* (1949) compared aspects of the libido and aggression as primary drives and specially pointed to the fact that whilst Freud had introduced ideas on the neutralization of the libido he had not sufficiently elaborated on the neutralization of aggressive energy. Neutralization of aggressive energy was regarded by the authors as very important for the achieve-

ment of permanent object relations. It also supplied the ego and superego with motor power and equipped particularly the ego for its function in action. Hartmann *et al.* (1949) continued with the following important implications:

*"In an objective danger situation discharge of aggressive energy is normal and physiologically performed; sexualization of objective danger leads to pathology (masochism). Since we consider objective danger situations as a prototype of all danger situations this difference in the relation of the two instinctual drives to objective danger may have far-reaching consequences for a general theory of neuroses (Hartmann). Aggressive energy not discharged in fight may be internalized. It may be used as cathexis of the superego and be a source of guilt feelings; internalization may also lead to neutralization of aggressive energy in the ego without interfering with the integrity of the individual; if it is internalized (in the ego) without neutralization the incentive to some kind of self-destruction may exist. It will be important to clarify in future the conditions under which these different solutions occur. While much seems to depend on the nature of the reality situation, particularly on the gravity of the danger, and on vicissitudes of the aggressive drive in the individual's previous life, a decisive part is played by the structure of the ego and the superego. Tentatively we are inclined to assume that the capacity to neutralize large quantities of aggression may constitute one of the criteria of "ego strength" or of the high capacity of the ego for integration. Alternatively, the internalization of non-neutralized aggressive energy in the ego may be the hallmark of a weak, or eventually masochistic, ego." (Hartmann *et al.*, 1949, p. 24)*

Hartmann did much for psychology with his considerations of the gradations of aggressive energy. The whole aspect of neutralization according to Joseph (1973) introduced the idea that:

*"...ego activities were cathected by more instinctualized aggressive energy while invaded by conflict, and more de-aggressified energy while functioning freer of conflict." (Joseph, 1973, p. 211)*

In conclusion Marcovitz (1973) has said:

*"A healthy feeling of one's own worthiness depends on the ability to meet difficulties, obstacles and challenges that are inevitable in the process of living. In the absence of such a feeling about oneself, we find feelings of helplessness, dependence, anxiety, and depression which we know lead inevitably to varieties of ineffective, inappropriate aggression which are usually more destructive and self-defeating than unconflicted aggression would be."*

(Marcovitz, 1973, p. 232, 233)

### 3.7 The role of therapy in the prevention of accidents

The traffic accident phenomenon has rapidly become a universal one. The road, the vehicle and the driver have been mentioned as three interacting agencies in the causation of road accidents. Prevention of accidents will have to centre around aspects of these three accident agencies.

Improvement of the driver's ability by means of any psychological therapy, has not been described to any degree in the literature of accident research. This might be due to the fact a driver would, in the first instance, have to volunteer for such therapy. In addition the employers of professional drivers might find it more economical to train new drivers than to persist with

an accident repeater. In the future, however, it could easily be feasible that laws concerning the holding of driver's licences might compel an individual to involve himself in some form of therapy if this were considered necessary. Haddon (1964) warned that it might lead to misuse to apply administrative action against individuals who have been repeatedly involved in accidents, for the simple reason that psychological evidence is not convincing enough. Steyn (1973) adopted an opposite approach when he said:

*"Much has been said about the democratic right of an individual to hold a driver's licence. Such an argument is naive and inconsistent; it is not the democratic right of an epileptic to drive a vehicle, it is not the democratic right of a convicted drunk to drive a vehicle; why should it be the democratic right of a psychologically deviant and maladjusted person, potentially capable of killing people?" (Steyn, 1973, p. 83)*

De Silva (1942) recognized that the public would resist encroachment on their freedom to drive automobiles as they wished, and knew that the attempt to convince them to seek assistance would be very difficult. He nevertheless felt that the two important elements of safety-mindedness, namely, responsibility and consideration for others, needed development through education and good example.

Shaw and Sichel (1971) have pointed out that:

*"...an undue proneness to accidents can be caused by many factors as it represents a*

*variety of human maladjustments. It is therefore similar to other complex human maladjustments, like incompetence or criminality, and has many causes. But these causes can be determined and remedial action can be taken."*  
(Shaw and Sichel, 1971, p. 421)

### 3.7.1 Prerequisites for therapy

The implementation of a programme of therapy would follow from indications obtained from a diagnosis of the accident repeater's records. Causes which are easiest to determine and identify would be the subject of the first remedial action. Other causes might not be readily apparent. They might be identifiable from statistical records, for instance. Remediation in such a case might be a programme of education for the public about the particular cause or hazard. Finally there are causes which might be sought for in the thought processes of the individual. In such cases it was considered convenient if the theory underlying the diagnosis be consistent for pre-test and post-test description of the individual. The change which would result from therapy should be the slow evolving of the patterns of structure considered bad to those considered good.

### 3.7.2 Change resulting from therapy

Eysenck (1952) suggested that from material available, patients treated with psychotherapy, showed



no more improvement than untreated populations. Freud (1937) had himself raised questions about the potential effectiveness of psychoanalysis as a form of therapy. He recorded his impression that psychoanalysis might often merely strengthen defenses rather than resolve basic conflict. Eisler (1950) defended change occurring as a result of psychoanalysis and suggested that appearance of change which occurred in conjunction with other forms of therapy were often based on suggestion, imitation, unwitting reinforcement of resistances or transference phenomena. He implied that the more effective and permanent change occurred when there was change of structure. Schafer (1967) continued such a line of reasoning and pointed out that the changes in the formal thought patterns of the patient were the most solid forms of change. Such formal thought aspects operated independently from the drives, defenses and conceptions of reality. He said:

*"...they include the following: the degree of autistic distortion running through psychic functioning - irrespective of the content and locale of the autisms; the pervasive, defensively prescribed methods of organizing, articulating, and communicating emotional experiences; consistent selective emphasis in perceiving and remembering; characteristic patterns in the organization of space, time, and motility; degree and style of humor; capacity for introspectiveness; and tolerance for free fantasy and self-confrontation." (Schafer, 1967, p. 40)*

Whilst in content, there could be superficial change, especially where the patient began to catch on to the methods

and emphases of the therapist, change in the formal aspects of thought is more suitable for an indication of the effectiveness of therapy.

### 3.7.3 Ego psychology and therapy

Freud did not write any systematized account of analytic therapy, nor did he designate standard procedures to be followed in therapy except of course, the rule of free association. His life work consisted, however, of assisting people. His followers elaborated on his principles of assistance. They elaborated on the idea of learning to know oneself; accepting emotional attitudes belonging to oneself; and understanding the dynamics which created and maintained conflicts. His observations that the ego was the recipient and synthesizer of interpretations lead to advances in ego psychology. The ego psychologist now engages in the continuous analytic pursuit of strengthening and expanding the ego, remedying developmental shortcomings, aiding neutralizations and utilizing the autonomous functions toward higher levels of integration.

Classical psychoanalysts had worked at the rapid uncovering of the id content but ego psychotherapy helped the individual understand his defensive structure. As the resistance crumbled before the synthetic and integrative functions of the ego, the individual achieves insight, usually

with little help from the therapist. As the person reached the terminal stage of therapy he was able to delay response; regress in service of the ego; and utilize verbalization instead of acting out type of communication.

#### 3.7.4 The Rorschach and ego psychotherapy

Buss (1966) pointed out that diagnosis in medicine traditionally had three purposes: firstly, it told something about the etiology of the disorder; secondly, it suggested something about the prognosis of the disorder; and thirdly, the diagnosis pointed to the type of treatment to be given. The traditional manner of applying a psychodiagnostic programme has not warranted its use by therapists. Meehl (1959) discovered in his investigation that only 17% of therapists questioned, used diagnostic testing before treatment. If psychodiagnosing testing is to survive, it will have to fulfil to a certain degree the same purposes as those of medical diagnosis. Cole and Magnussen (1966) have suggested that diagnostic categories should be developed which could be related empirically to treatment outcome. Meehl (1960) said that it greatly speeded therapy if the therapist had prior knowledge of the dynamics of the client and content from such devices as the Rorschach. Schafer (1967) wrote extensively about the value of Rorschach test analysis as a measure of psychological change. He indicated that the projective technique showed an indirect approach to the functioning

of the patient. The clear emergence of self-expressive and defensive aspects of mental functioning was facilitated. Schafer (1967) illustrated the changes within the ego from an initial test to a retest after therapy in a number of different ways. Firstly, there was sharper differentiation between self-representation and object representation. Secondly, where an individual in the initial test, showed a helplessness of the ego before a destructive superego, he might in the retest show a degree of containment of the superego by directed, assertive action. Thirdly, a normal form of response was found where initially pathological weakness of defense had indicated a direct representation of archaic fantasy in consciousness. Improved reality testing might emerge in the form of greater autonomy of the ego function from drives and affects; ascendancy of secondary over primary process thinking; and more adequate, less arbitrary synthetic functioning. Finally there was more regression in service of the ego in the form of more creative and adaptive responses.

Schafer was well aware of methodological aspects which were needed to give the high order of conceptual and clinical sophistication to the study of personality change in test and retest situations. He mentioned the need for independent judges to establish reliability of interpretation. Independent judges were required to avoid contaminated interpretations. Such judges, at the same time, would

have to have a knowledge of which was the initial and which was the retest protocol aided in noting significant changes toward more adequate ego functioning. Schafer recognized that it was good that a patient be compared with himself. He also said that the quantitative direction needed careful attention because the good clinician recognised that sometimes significant changes were indicated by relatively small scores. Finally he mentioned the following very important methodological feature:

*"...the research unit should be interpretations and not scores or theme counts. Only then may we continue to work in context, which is to say, work with clinical data, clinically. Scores, content, sequence, attitudes, behaviour, and style of verbalization must all feed into the interpretations." (Schafer, 1967, p. 81)*

## CHAPTER FOUR

## THE PRESENT STUDY

4.1 The aims of the present study

- (a) The study attempted to discover whether the drivers of motor vehicles who were considered to be rational and mature thinkers when tested, had a lower accident liability than those who were impulsive and immature.
- (b) The study attempted to discover whether the different determinants of a test measure would discriminate between good and bad drivers.
- (c) The study planned to discover whether differences in the amount of feedback, as determined in a psychomotor task, bore any relationship to driving ability or the thought processes of the driver.
- (d) An attempt was made to discover whether any of the scores referred to in (a), (b), or (c) above, could be used as predictors of driving ability.

- (e) The study aimed at making some conclusions as to the extent to which the preceding psychodiagnostic programme, when considered in the light of ego psychology, could contribute to the treatment planning of drivers.

## 4.2 Hypotheses

### 4.2.1 General hypothesis

The accident liability of drivers will be associated directly with the degree to which their thought is dominated by the primary process function.

### 4.2.2 Specific hypotheses

- (a) An hypothesis relating accident liability to primary process dominance which is inferred from Rorschach measures viz., Holt's system of primary process scores.

$H_1$  : High accident liability is correlated with

- i High primary process scores
- ii High content scores
- iii High formal scores
- iv Low creativity scores
- v Low form level scores
- vi High aggression scores.



- (b) An hypothesis relating accident liability to the degree of control of response inferred from selected Rorschach determinants.

$H_2$  : High accident liability is correlated with

- i Low M%
- ii Low FC%
- iii Low M/FM
- iv Low FC/CF+C
- v High C'/c
- vi Low F+%

- (c) An hypothesis relating accident liability to difference in the amount of feedback aiding motor activity in a laboratory task.

$H_3$  : High accident liability is correlated with high feedback error which is measured in a modified Moëde two-hand motor co-ordination test.

### 4.3 Research design

#### 4.3.1 Definition of the population

The population was defined as consisting of experienced motor vehicle drivers. This meant that they were in possession of a driver's licence and had driven for at least three months on public roads. None had been

guilty of any major driving offence in their official vehicles.

#### 4.3.2 Definition of the sample studied

European bus drivers belonging to the Durban Corporation Transport Company were chosen as a representative sample of the population defined above. Each driver in the representative group had an equal opportunity of being selected. The group randomly chosen for testing numbered forty. After the testing programme had been completed, and a study of the accident records of the subjects begun, it was discovered that the accident records of two drivers were incomplete. These two were then excluded and the final sample for the purpose of the research numbered thirty-eight. This sample was regarded as the most representative for the following reasons:

- (a) They were co-operative in the administration of the psychodiagnostic programme;
- (b) they had undergone a standard type of training in the training school run by the Transport Company;
- (c) they had been subjected to a standard type of medical examination before their employment

and had had repeated medical check-ups every six months during their service with the Company. They were thus regarded as medically fit for driving;

- (d) they had trained on the same type of vehicle and driving during their service with the Company was confined to this type of vehicle;
- (e) each driver, during his period of service, had been exposed to similar driving hazards, as far as this was possible. It was the policy of the employer to change drivers from one route to another after a certain period of time so that there were periods of operation over all the likely routes.
- (f) each driver was subject to uniform policy as regards days and hours of service, remuneration, leave conditions, relationships with the public, and discipline.
- (g) details of the service record of each driver were contained in a confidential file. These details included the description of accidents involved; reports from injured parties; reports

of legal proceedings; and reports of the disciplinary officers of the Company.

#### 4.3.3 Observations made on the sample<sup>1</sup>

- (a) Preliminary observations made about each driver included his name, age, and length of the service of the subject.
- (b) Subsequent to the administration and scoring of the test programme, the accident records of each driver were consulted to discover the dates when these accidents had occurred, and the total driving time of the subject.

#### 4.4 Test description and administration

Two measuring instruments, namely, the Rorschach technique and a modified version of the Moëde two-hand motor co-ordination test, were used to obtain scores for the research project.

##### 4.4.1 Description of the Rorschach test material and manner of administration

The Rorschach test consists of a series of symmetrical inkblots contained on ten printed cards. These ink-

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1. see also appendix G

blots were made by spilling ink on white paper, folding the paper once and then pressing the folded halves together. When the ink had dried and the paper unfolded, a symmetrical design was obtained. Reproductions for use were made, these being mounted on white glossy plates 7" x 9½" in size. Five of the plates contain blots in various shades of gray, two in red and gray, and three in bright colours.

In the examination room the plates were placed, face down on the table. The examiner seated himself on the same side of the table as the subject in order to observe more effectively. This seating arrangement was carried out as naturally as possible. No special attempt, however, was made to reduce tension in the subject for it was reasoned that if rapport was too successful, the subject might withhold consciously or unconsciously some significant material. After an introduction and some preliminary questions had been answered, the subject was told that he would be shown the plates one at a time. He was instructed to tell the examiner what he felt each plate looked like; what any section might represent; and what the blots made him think of. He was allowed to turn the plate any way that he wished and when he could see nothing more to give as a response, he was requested to put the card down on the table. The time for each response as well as the time for the total examination of the plate was recorded. An inquiry

about the responses followed after each plate. During the inquiry the subject was reminded where he had seen the response, and asked if he would like to make any further comment about it, describe it any further, or tell something about it. During the inquiry the tester also inquired into the meaning of certain words he had used, and also asked the subject to say, whenever possible, whether he had enjoyed the response or not.

#### 4.4.2 Description of the modified version of the Moëde two-hand motor co-ordination test and the manner of administration

The apparatus consisted of a metal framework which contained two metal shafts situated at right angles to each other. At the end of each shaft was a hand-wheel control. Turning either hand-wheel control caused a metal platform to move. This platform was constructed so as to be situated on top of the two shafts. When the first hand-wheel control was turned in an anti-clockwise direction the platform moved towards the subject, whilst turning it in a clockwise direction caused the platform to move away from the subject. The second hand-wheel control, when moved in an anti-clockwise direction, caused the platform to move to the right and when turned in a clockwise direction would cause the platform to move to the left of the subject. Attached to each hand-wheel

control was a collar which could be fastened or loosened with a key. The collar mechanism, built in by the author causes the apparatus to be different from that described by Roos (1955).<sup>1</sup>

A sheet of paper with a printed circular target was fastened to the platform. The target was in the form of a pathway with well-defined boundaries.<sup>2</sup> The pathway was a quarter of an inch wide. A cursor was secured in a vertical position by means of a metal holder in such a manner that it was able to trace a path on the circular target as the platform moved. The cursor was brought to the start of the circular target at the beginning of the trial by the testee and a path was then traced until the end of the circular pathway was reached. A standard set of instructions was arranged for the subjects, as follows:

*"We now come to the mechanical task which I would like you to do as well as you can. As you turn these hand-wheel controls, this platform will move in a left or right direction or a north or south direction. At the order to start you must turn the wheels so that the cursor traces a line from this point, called the start, to the point there, which is the end of the pathway. You must work quickly but care-*

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1. The writer is grateful to Mr. T. Bowden, a mechanical engineer for his advice and assistance in building the apparatus.
  2. See Appendix F for photographs of the apparatus.



*fully. Do not let the cursor cross over the boundary lines of the pathway for this will be counted against you. For a short while now you may practice to see how well you can keep in the pathway."*

A brief demonstration was given to the subject after which he was allowed to practise for a minute. He was thereupon given his first five trials. The time taken to complete each trial was noted. Instructions for the second series of five trials remained exactly the same as for the first series and the subject was not told that he would be operating the apparatus with the loosened hand-wheel controls. The operation of the apparatus was changed by turning a key in the locks on the hand-wheel controls. This had the effect of disengaging the hand-wheel controls. The first horizontal pin would begin to move around until engaged the vertical pin on the collar adjacent to the hand-wheel control. The whole collar now moved around until the horizontal pin on the collar engaged the vertical pin on the shaft. Thus the total effect was that the hand-wheel control would move the platform only after some amount of time and turning had elapsed. During the period preceding final engagement of the platform no mark was made on the target paper by the cursor. All in all, it required  $1\frac{1}{2}$  full turns on the hand-wheel to move the cursor from the one boundary of the pathway directly across to the other boundary.

#### 4.5 Scoring of the test material

This section includes a description of the following:

- (a) Holt's system of Rorschach measures which were used to infer primary process thinking;
- (b) Selected Rorschach determinants which were used to infer the degree of control of response of the subject;
- (c) Scores obtained from the modified version of the Moëde two-hand motor co-ordination test which were used to infer a feedback error;
- (d) The accident liability score.

#### 4.5.1 Holt's system of Rorschach measures for primary process thinking

Primary process thinking according to the method used by Holt,<sup>1</sup> was measured in the first place by twenty-two categories of content. This arrangement was based on the assumption that there are responses which have libidinal or aggressive themes. Such responses indicate drive domination in varying degrees and would therefore manifest primary process thinking. Libidinal content is divided into six different categories, viz., oral, anal, phallic,

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1. This summary was extracted from an unpublished draft copy of the 9th edition of the Rorschach manual for proprio scoring, which Professor R.R. Holt was kind enough to send to the writer.

exhibitionistic, homosexual and miscellaneous. A further five categories are of aggressive content, viz., potential aggression from the standpoint of the aggressor; potential aggression from the standpoint of the object aggressed against; a category where the subject is engaged in active aggression; one where the object is aggressive and finally a category which indicates the results of aggression.

Each of these categories occurs on level 1 or level 2. A level 2 response shows evidence of some socialized thinking whereas the level 1 response is blatantly libidinal or aggressive. A subject never produces drive-dominated ideation as a result of his own purposeful striving. These responses represented rather, his own spontaneous utterances. They were based on his past experience; the way that he perceived the unstructured Rorschach stimulus; and also what he felt appropriate to communicate to the tester.

Two scores arise from this section on content. Firstly content itself was calculated as being the total number of responses which contained drive-dominated ideation over the total number of responses in the record. A second score was taken as aggression. Aggression figured very prominently in the literature study as a characteristic of drivers and it was felt that this sub-section of content should receive prominence. Aggression was represented then as the total number of responses which indicated

aggression over the total number of responses in the record.

The next section of measurement concerned the formal aspects of the responses. There are thirty-seven verbalization categories which refer to the perceptual organization of the response and to the language in which the response is verbalized. A score for these formal characteristics was represented as being the total number of responses which contain formal characteristics over the total number of responses.

The content and formal characteristics constituted the amount of primary process thinking in the record. Thus the primary process or pripro score emerged as representing the total number of responses indicative of primary process thinking over the total number of responses in the record.

A third section of the scoring system was concerned with the effectiveness or ineffectiveness with which the subject uses his control and defences to cope with the thinking in which he is involved. He might be able to express his ideas in an acceptable or scientific way or *vice versa*. The extent to which he is master of his communications has been designated as his defense effectiveness (DE). A DE score was expressed as the sum of the DE

ratings in the record over the total number of pripro responses. A brief summary of information for the calculation of DE appears in Table 1.

TABLE 1

Description and rating of defense effectiveness

Rating	Description	Explanation
+2	Highly successful control and defense	High form level; no disturbance
+2a	Highly successful response, undefended	High form level; no disturbance
+1	Successful control and defense	Lower form level; mild discomfort
+1a	Successful response undefended	Lower form level; mild discomfort
0	Moderately successful control and defense	Difficult formal and control aspects; form level fair.
0a	Moderately successful response, undefended	Difficult formal and control aspects; form level fair.
-1	Relatively unsuccessful control and defense	Poor response with one or two saving aspects
-1a	Relatively unsuccessful response, undefended	Poor response with one or two saving aspects
-2	Unsuccessful control and defense	Much discomfort; low form level
-2a	Unsuccessful response undefended	Much discomfort; low form level
-3	Disorganized response, pathological attempt at defense	Mostly in psychotic records
-3a	Disorganized response, undefended	Mostly in psychotic records.

Holt's next concern was to measure defense demand. Defense demand indicates the amount of reorientation necessary to change a drive-dominated response to one that is socially acceptable. The more pathological the response the greater will be the need for control and defense. Defense demand (DD) was the next score and it was represented as the sum of the defense demand scores over the total number of primary process responses. A brief summary of the information for the calculation of DD appears in Table 2.

TABLE 2

Description and rating for defense demand of pripro responses

Rating	Description	Explanation
1	No apparent need for defense	Aspects of pripro contained only implicitly
2	Slight need for defense	Only slight tension aroused; includes level 2 content or formal scores
3	Moderate need for defense	Arousal of moderate tension; includes combinations of level 1 content and level 2 formal scores or <i>vice versa</i>
4	Considerable need for defense	Responses like reference to sex organs; also combinations of level 1 content and level 1 formal scores
5	Great need for defense	Shocking ideas implying breach of judgment; availability of ideas usually kept unconscious
6	Greatest need for defense	Responses usually in psychotic records

Holt's system of form level scores is similar to that described by Mayman (1960) with the exception that Fv score has been split into Fv and Fa. Form level was scored for all the responses in the record. It was represented as being the total number of all form level scores over the total number of responses in the record. A brief summary of the information for the calculation of the form level scores appears in Table 3.

TABLE 3  
Description and rating of form level scores

Rating	Type	Description
+2	F+	Sharp convincing forms easily seen
+1	Fo	Popular and near popular forms
0	Fw+	Reasonably plausible but not very convincing forms
-1	Fw-	Forms bearing only a slight resemblance
-2	Fv	Vague, non-definitive forms
-3	Fa	Amorphous forms in which form plays no role
-4	Fs	Spoiled form responses where a familiar and good response is given but some specification is added which lowers the acceptability of the response as a whole.

The final scoring section is called the creativeness score. All the responses in the record were scored for creativeness and the score is represented as the sum of



the creativeness ratings over the total number of responses. A brief summary of information for the calculation of the creativeness score appears in Table 4.

TABLE 4

Brief description of the ratings of creativeness

Rating	Description	Elaboration
1	Distinctly original creative response	Definitive form with accuracy and richness of quality
2	Moderately original creative response	Clearly out of the ordinary; good elaboration with use of colour, movement and shading
3	Unusual but not original	Unusual area with rich elaboration
4	Unoriginal response	Without richness

#### 4.5.2 Rorschach determinants as measures of the degree of control<sup>1</sup>

Whilst the Rorschach record of each subject was scored in its entirety, certain determinants were regarded as being more suitable than others for use as indicators of the idea of degree of control of response. The rationale for this has been noted above.<sup>2</sup>

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1. See Appendix E, p. 148 for response areas used with Rorschach test.
  2. See p. 63-67.

(a) M%

Piotrowski (1957) says that it is best to score as M all responses plainly indicating overt movement, definitive postures, or any kind of muscular tension, including attempts at refraining from tension and effort. Good quality M presuppose a distinct human-like form that behaves like a living organism. The response must be accompanied by kinesthetic innervation on the part of the subject. This requirement is met, according to Piotrowski, when the subject gives as a response, somebody moving, doing something, exerting force to prevent any overt movement or carrying out overt movements. M% is calculated by the total number of M responses divided by the total number of responses and bringing it to a percentage.

(b) M/FM

The scoring of the M as part of this ratio has already been described above. Piotrowski (1957) says that FM is scored when the response describes animals in a pose that is typical of an animal. The response is accompanied by a feeling that muscular tension is changing, or has become fixed. The M/FM score consisted of the number of M in the record in relation to the number of FM.

(c) FC%

The FC response is scored when a plausibly

perceived form has an acceptable colour accompaniment. FC% was calculated by dividing the number of FC in the record by the total number of responses and bringing the result to a percentage.

(d)  $FC/CF+C$

CF is scored where colour in the first instance suggests itself to the subject and then secondly, form is used to give shape to the colour. In the pure C response colour is used but no consideration is given to form. The  $FC/CF+C$  score consisted of the number of FC in relation to the sum of the number of CF and C.

(e)  $C'/c$

The  $C'$  of this ratio is scored in a record where there is perception of dark or black and when the dark and black contribute in a meaningful way to the content of a response.  $C'$  was also scored when a meaningful response contained a suggestion of disgust or repulsion.

The  $c$  of the ratio was scored when an area of the response were seen as different in brightness from the adjacent area. It had reference to the texture of an area. The  $C'/c$  score consisted of the number of  $C'$  responses in the record in relation to the number of  $c$ .

(f) F+%

The frequency tables of Beck (1950) were used to establish which responses could be regarded as being of high quality or accurate pure form. The way that the subject elaborated on the form response in the inquiry was particularly noted. In the case of a response scored F-, confusion or lack of elaboration was often noted. The F+% score was calculated in the same way as in Beck (1950) viz., the total number of F+ over the sum of the F+ and the F- times 100.

4.5.3 Scoring of feedback error on the modified version of the Moëde two-hand motor co-ordination apparatus

The two tasks that were carried out on the modified version of the Moëde two-hand motor co-ordination apparatus were described as firstly, the normal feedback task and secondly, the diminished feedback task. It was in the latter task that the hand-wheel controls operated freely to the extent of one-and-a-half turns owing to the loosening of the collar. The subject was given five trials in each task, and each trial was scored according to errors. Errors were taken as having occurred when the line traced by the cursor touched either boundary of the pathway anywhere from the start to the finish. At times however, the touch was so slight as to be doubtful, in which case only ,5 error

was scored. Where the line left the pathway, an error was scored at the point of exit and another at the point of re-entry. Finally, it might happen that instead of immediately attempting to return to the pathway, the line continued for some distance outside the pathway, then the subject was penalized at the rate of ,5 error for every ,25' length of an inch of line outside. The following is an example of a score on one trial:

Clear errors	7
Doubtful errors	3
Times when exit and re-entry occurred	1
Length of line outside pathway	,75"
Total error score	= 12,0

The feedback error score was calculated as the mean of the normal feedback score subtracted from the mean of the diminished feedback score.

#### 4.5.4 Description of the accident liability

It was possible to establish a reliable criterion score for the research study. It has already been suggested above that that study centred around a sample of drivers about whom necessary data could be obtained with relative facility. This included records of the

accident involvement of the drivers. These records contained the description of the accident, its seriousness, and the date on which it occurred. It was also established what the exact driving exposure time in days and months had been for each driver. It was confirmed that they had as far as possible been subjected to the same driving routes. These considerations were basically those which Shaw and Sichel (1971) used in their discussion of the reliability of a criterion score for accident liability. The work of Shaw and Sichel is important because they proved the reliability of the criterion score and made it possible for the calculation of accident liability score to be used in other studies. Shaw and Sichel suggested that in order to make progress in the study of the personal factor in accidents, statistical methods should be devised which comply with certain requirements. The accident history of one individual should not, for instance, have any influence on the statistical analysis of the accidents of another driver. The statistics should be capable of testing the hypothesis of constant liability within the individual even though the liability is not necessarily related to the personal component alone. They went on to describe the earlier efforts to obtain a criterion which would have shown the degree of accident liability. Earlier

work suggested that the potential for accidents could be measured by a negative binomial distribution law. This first statistical determination of accidents as suggested by Greenwood (1919) was considered as a significant advance in accident theory. The suitability of these first statistics was, however, short-lived.

There followed attempts to establish accident liability in terms of the correlation of the number of accidents in two short periods of time for a group of individuals. It was noted here that when there were a few persons with a large number of accidents in both periods, the correlation was very high. If these few were excluded, the correlations dropped considerably.

It was with the realization of these earlier shortcomings in statistical method that Shaw and Sichel proposed the following accident liability criterion which was also used in this project.

Data was obtained for each person as follows:

- (a) The length of exposure time to accident risk measured in actual driving days;
- (b) the number of accidents which occurred during the exposure time;
- (c) the dates when the accidents occurred.



The accident liability score was then calculated as follows:

$$t = \frac{l}{r + z + c}$$

where

- t = accident liability score  
 l = the length of exposure to risk  
 r = the number of accidents during the exposure time  
 z = 5/8 = the rectangular random deviate,  $0 \leq z \leq 1$   
 c = 3/8 a constant which will reduce the negative bias of estimator t

An advantage of this method is the fact that it is not only the long seasoned drivers that need be included in the sample but also those who have been discharged early after their training period has come to an end. As the authors of the method rightly suggest it is in the latter group that one is going to find characteristics which might be more related to the accident liability score than those found with the more seasoned drivers. It should be pointed, however, that a good driver might have a short record also, for he might leave on promotion or to another type of work.

In their calculation of the reliability of this measure, Shaw and Sichel took 193 drivers who had had four or more accidents. All 193 men were exposed to the same environmental conditions. The exposure length for each driver was divided into equal parts and from the number of accidents incurred in each half, the estimates  $t_1$  and  $t_2$  were obtained. The reliability coefficients was equal to .85.

The term "accident" needed definition in this research. Discussion by the writer with the authorities of the Company where the research was conducted led to the conclusion that an accident could be defined as for instance, according to Arbous and Kerrich (1951). These authors indicated "an accident occurred when in a chain of events, each of which is planned or controlled, there occurs an unplanned event, which being the result of some non-adjustive act on the part of the individual may or may not result in injury." There might of course, not be injury but damage to property or delay in continuing a journey.

#### 4.6 The statistical model

The results of the study were evaluated in the follow-

ing way:<sup>1</sup>

- (a) The establishment of an intercorrelation matrix of the test score and the accident reliability score. A level of significance for the correlation coefficients was calculated;
- (b) The choice of a regression equation of the best battery of predictors;
- (c) Calculation of the means and standard deviation scores for the accident liability score and for the best battery of predictors;
- (d) A comparison of the estimates of the accident liability score with the observed values;
- (e) The calculation of the standard error of estimate.

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1. The calculations were performed on a Data General Corporation Nova Computer at the Department of Engineering at the University of Durban-Westville, Durban. Prof. F. Calitz, M.Com. (Stell.) D.Com. (S.A.) Head of the Department of Statistics, University of Durban-Westville, Durban, assisted the writer with the writing of the programmes, the computations, and the co-ordination of results.

## CHAPTER FIVE

## RESULTS OF THE PRESENT STUDY

5.1 General

The results of the study were portrayed in two ways. In the first instance, there were three sets of scores, which represented the results of tests done with the subjects. Secondly, there were the results of calculations which made use of these sets of scores, and which formed part of the statistical evaluation of the study.

5.2 Test results

The test results included firstly, those scores pertaining to Holt's system of Rorschach measures for primary process thinking; secondly, those scores pertaining to Rorschach determinants which reflected degree of control; and thirdly, the score calculated from the measures on the modified version of the Moëde two-hand motor co-ordination test which reflected feedback error.

5.2.1 Scores relating to Holt's system of Rorschach measures  
for primary process thinking

The abbreviated form used for each measure is given in the following list of Rorschach measures for

primary process thinking:

- (a) Content (Co)
- (b) Aggression (Agg)
- (c) Formal characteristics (Fo)
- (d) Percentage primary process thinking  
(% Pripro)
- (e) Defense effectiveness (DE)
- (f) Defense demand (DD)
- (g) Form level (FL)
- (h) Creativeness (Cr)

Scores for each subject according to this scheme appear in Table 5.

TABLE 5  
 Scores on Holt's system of Rorschach measures  
 for primary process thinking

Sub- ject	Co	Agg	Fo	Pri- pro	DE	DD	FL	Cr
1	,40	,20	,24	52	,29	3,9	,65	2,8
2	,39	,20	,25	52	,23	1,6	,27	3,3
3	,54	,35	,20	62	,66	2,1	,52	3,5
4	,24	,21	,50	70	,28	2,0	,59	3,5
5	,39	,18	,52	65	,20	2,7	,43	3,5
6	,27	,21	,16	45	,41	1,3	,64	3,1
7	,39	,34	,43	71	,31	2,1	,68	3,6
8	,28	,26	,06	32	,75	,62	,40	3,4
9	,40	,24	,66	87	,32	3,1	,89	3,0
10	,65	,30	,09	70	,26	2,2	,48	3,3
11	,27	,24	,19	50	,55	1,1	,58	3,7
12	,48	,44	,16	64	,38	2,0	,40	3,0
13	,23	,21	,17	36	,76	,93	,36	3,3
14	,59	,23	,53	67	,24	2,20	,96	3,5
15	,52	,44	,19	67	,27	2,00	,77	3,5
16	,42	,31	,09	46	,52	1,50	,73	3,2
17	,56	,25	,14	58	,30	2,00	,51	3,1
18	,43	,24	,66	76	,06	3,00	,71	4,0
19	,46	,35	,22	60	,36	2,00	1,30	3,4
20	,40	,31	,20	67	,27	1,80	,82	3,4
21	,50	,25	,44	69	,23	2,80	,94	3,8
22	,29	,16	,03	31	,77	,53	,62	3,6
23	,62	,26	,31	76	,25	2,90	,56	3,7
24	,46	,34	,32	68	,23	2,70	,46	3,5
25	,40	,24	,06	44	,31	,94	,20	3,6
26	,32	,18	,17	50	,53	1,10	,21	3,0
27	,30	,18	,04	34	,60	,70	,48	3,4
28	,46	,16	,14	38	,58	,82	,68	3,4
29	,22	,12	,20	42	,35	1,00	,60	3,5
30	,36	,17	,18	47	,63	1,10	,53	3,2
31	,41	,30	,11	48	,54	1,20	,37	3,3
32	,32	,25	,08	37	,73	,83	,30	3,0
33	,34	,21	,13	45	,81	,96	,24	3,6
34	,42	,25	,48	63	,31	3,40	,56	3,5
35	,52	,34	,14	62	,42	1,70	,66	3,2
36	,31	,26	,09	40	,76	,90	,26	3,7
37	,27	,20	,13	36	,47	1,00	,58	3,1
38	,29	,11	,21	36	,67	,61	,25	3,5

### 5.2.2 Scores relating to Rorschach determinants

Selected Rorschach determinants were used to indicate the degree of control exercised by the subject. The scores for each subject are shown in Table 6.

TABLE 6

Subject scores of selected Rorschach determinants

Sub- ject	M%	M/FM	FC%	FC/CF+C	C'/c	F+%
1	7	,75	13	1,25	1,75	71
2	8	,25	7	3,00	,60	63
3	7	,80	15	2,00	6,00	70
4	4	,16	6	3,00	2,00	64
5	2	,10	2	,50	,20	60
6	6	,43	20	2,00	2,50	79
7	5	,10	2	,50	,60	66
8	10	,50	9	4,00	,14	83
9	5	,50	3	,25	2,00	74
10	8	,33	4	,34	,80	60
11	4	,10	8	2,00	1,00	70
12	6	3,00	10	5,00	1,10	80
13	13	,66	11	3,50	,80	87
14	7	,43	9	,80	1,43	68
15	7	,43	14	2,30	,86	77
16	2	,14	10	1,25	2,50	80
17	14	,80	12	1,20	2,50	74
18	4	,14	4	1,00	2,00	63
19	2	,14	10	1,00	1,30	68
20	12	,43	6	3,00	,75	66
21	3	,17	6	,66	1,00	63
22	18	3,00	10	2,50	,20	82
23	10	1,00	10	4,00	,40	60
24	5	,16	8	1,50	2,30	60
25	12	,60	16	8,00	,50	76
26	17	,90	14	2,50	,40	83
27	18	1,50	12	3,00	2,00	76
28	8	,60	20	10,00	,40	87
29	22	1,60	8	1,00	1,30	77
30	11	,75	21	11,00	2,70	78
31	8	,67	23	3,50	2,00	81
32	8	1,00	16	6,00	1,00	78
33	16	1,30	16	2,00	1,60	83
34	2	,06	11	5,00	,80	66
35	4	,30	22	5,50	1,60	73
36	7	1,50	12	2,50	1,50	75
37	18	,60	9	,80	1,20	71
38	12	,80	16	2,60	,30	76



5.2.3 Score relating to the modified version of the Moede two-hand motor co-ordination test

The above-mentioned apparatus was used to ascertain the effect of diminished feedback on the performance of the subjects. The scores for the test appear in Table 7.

TABLE 7

Scores on modified version of the Moede two-hand motor co-ordination test

Subject	Normal Feedback	Diminished Feedback	Feedback Error
1	7,7	13,6	5,9
2	8,3	13,1	4,8
3	12,1	17,3	5,2
4	11,3	18,5	7,2
5	8,2	19,0	10,8
6	12,1	23,2	11,1
7	9,7	19,9	10,2
8	4,3	8,6	4,3
9	9,5	17,5	8,0
10	13,7	21,3	7,6
11	8,6	13,7	5,1
12	12,1	20,4	8,3
13	3,7	7,9	4,2
14	11,3	16,4	5,1
15	13,8	22,4	8,6
16	15,8	21,9	6,1
17	14,0	18,8	4,8
18	10,8	15,7	4,9
19	11,3	17,9	6,6
20	7,0	13,9	6,9
21	7,2	11,1	3,9
22	7,0	10,2	3,2
23	15,7	20,9	5,2
24	7,4	14,2	6,8
25	6,0	9,7	3,7
26	10,9	13,3	2,4
27	8,3	10,8	2,5
28	10,5	12,8	2,3
29	10,7	13,3	2,6
30	8,8	10,9	2,1
31	11,6	14,5	2,9
32	10,3	14,9	4,6
33	9,2	11,9	2,7
34	12,5	17,7	5,2
35	10,4	16,5	6,1
36	6,6	11,3	4,7
37	11,1	14,2	3,1
38	12,6	14,8	2,2

### 5.3 Results of the statistical calculations

The results of the statistical calculations were embodied in:

- (a) an intercorrelation matrix of the test scores and the accident liability score;
- (b) regression equations for
  - (i) the battery of best predictors of the accident liability score (selected from 14 scores exclusive of the pripro score),
  - (ii) the battery of best predictors of the accident liability score (selected from 15 scores inclusive of pripro as a score),
  - (iii) pripro as the only predictor of the accident liability score;
- (c) the means and standard deviations for the accident liability score and the best predictor scores;
- (d) a comparison of the estimates of the accident liability score with the observed values.

#### 5.3.1 The intercorrelation matrix

The intercorrelation matrix included eight scores from Holt's system of Rorschach measures for

primary process thinking; six scores of the selected Rorschach determinants; one score for feedback error (FE), and the accident liability score. The correlations which are significant at the 5% level are indicated in Table 8.

TABLE 8

	t	Co	Agg	Fo	% <sup>P</sup> P	DE	DD	FL	Cr	MZ	M/F <sub>M</sub>	FC%	FC/CF +C	C'/c		
t	X															
Co	-,612	X														
Agg	-,410	,510	X													
Fo	-,702			X												
% <sup>P</sup> P	-,935	,627	,478	,744	X											
DE	,847	-,492		-,636	-,768	X										
DD	-,764	,505		,693	,725	-,722	X									
FL	,477	-,325		-,408	-,461	,425	-,473	X								
Cr									X							
MZ	,571	-,378	-,492	-,498	-,562	,401	-,562	,382		X						
M/ <sub>FM</sub>	,611	-,307	-,438	-,466	-,541	,563	-,540			,726	X					
FC%	,478			-,557	-,489	,494	-,455					X				
FC/CF +C	,308			-,337	-,335	,318	-,459						X			
C'/c														X		
F+%	,782	-,431		-,586	-,696	,740	-,602		-,337	,446	,449	,608	,405		X	
FE	-,576		,533	,376	,582	-,502	,510	-,324		,605	-,498	-,402	-,375		-,418	X

INTERCORRELATIONS OF SCORES OF TEST BATTERY WHICH ARE  
SIGNIFICANT AT 5% LEVEL

5.3.2 Selection of batteries of the best predictors and their regression equations

The two batteries of best predictors of the accident liability score are indicated in the tables which follow. As was mentioned above, the first battery of scores does not include pripro as a score. It was felt necessary to note whether any of the subscores in primary process thinking measures could play as strong a role as the composite score itself, i.e., the pripro score. In the second battery pripro as a score is included with the 14 others.

TABLE 9

Battery of best predictors of the accident liability score selected from 14 predictors

Predictor (in rank order)	Mean	SD	$r^2$
DE	,437	,199	,718982
M%	8,737	5,179	,776325
F+%	72,842	7,889	,802025
Co	,398	,110	,824138
Fo	,235	,168	,849047
Cr	3,397	,247	,869637
Agg	,247	,007	,885069
C' /c	1,263	,743	,885367
FC/CF+C	2,892	2,486	,885659
Mean $\hat{t}$ = 122,053		SD = 42,003	

The regression equation for this battery is:

$$\begin{aligned}
 X_o &= -71,49x_1 -114,373x_2 -97,5739x_3 +42,6686x_5 \\
 &+28,8102x_8 -0,249645x_9 -1,15387x_{12} -3,77248x_{13} \\
 &+2,05821x_{14} -54,5052
 \end{aligned}$$

where  $X_o$  = the estimated score for the criterion, and

$x_1$	=	the observed score on Co
$x_2$	=	" " " " Agg
$x_3$	=	" " " " Fo
$x_5$	=	" " " " DE
$x_8$	=	" " " " Cr
$x_9$	=	" " " " M%
$x_{12}$	=	" " " " FC/CF+C
$x_{13}$	=	" " " " C'/c
$x_{14}$	=	" " " " F+%

TABLE 10

Battery of best predictors of the accident liability score  
selected from 15 predictors

Predictor (in rank order)	Mean	SD	$r^2$
Pripro	54,289	14,497	,8905
DE	,437	,199	,925655
F+%	72,842	7,889	,93396
Cr	3,397	,247	,944596
FC/CF+C	2,892	2,486	,947234
FL	,558	,232	,949077
M/FM	,632	,566	,949348
Mean t = 122,053		SD = 42,003	

The regression equation for this battery is:

$$X_o = 1,75216x_4 + 31,5595x_5 - 12,07x_7 + \\ 20,6788x_8 + 4,08045x_{10} - 1,19331x_{12} + \\ 1,47274x_{14} + 33,4555$$

where  $X_o$  = the estimated score for the criterion and

$x_4$  = the observed value on pripro

$x_5$  = " " " " DE

$x_7$  = " " " " FL

$x_8$  = " " " " Cr

$x_{10}$  = " " " " M/FM

$x_{12}$  = " " " " FC/CF+C

$x_{14}$  = " " " " F+%

### 5.3.3 Regression equation with pripro as the only predictor

Because of the strength of the pripro score, as noticed both in the intercorrelation matrix and in the battery of best predictors of accident liability score selected from 15 scores, a regression equation was calculated for pripro as the only predictor. In this way, pripro as a predictor was compared with the two previous batteries of predictors.

The regression equation is:

$$X_o = - 2,70812x_4 + 269,075$$

where  $X_o$  = the estimated score for the  
criterion and

$x_4$  = the observed score on pripro.



5.3.4 A comparison of the estimates of the criterion with the  
observed values

To test the prediction properties of each of the three above equations, the estimated criterion according to each of the three regression equations was calculated for each of the thirty-eight subjects. It was compared with the observed criterion score. The results are indicated in tables 11, 12, and 13.

TABLE 11

A comparison of the estimates of the criterion  
with the observed values  
Regression equation no 1

Observed score	Estimate no. 1	Error of Estimate no. 1
102	99,990	2,010
90	97,178	7,178
101	120,253	19,253
84	88,035	4,035
90	77,319	12,681
135	142,730	7,730
64	85,467	21,467
212	183,033	28,967
65	68,361	3,361
73	80,185	7,185
124	147,265	23,265
103	101,128	1,872
180	184,710	4,710
81	68,378	12,622
110	102,649	7,351
140	138,954	1,046
109	103,316	5,684
73	60,676	12,324
85	97,829	12,829
89	97,957	8,957
87	81,901	5,099
200	200,748	,748
70	73,323	3,323
77	64,985	12,015
139	142,850	3,850
139	156,682	17,682
190	164,037	25,963
160	167,371	7,371
145	159,229	14,229
128	136,741	8,741
151	142,388	8,612
181	163,169	17,831
164	181,257	17,257
82	80,658	1,342
108	102,755	5,245
168	167,915	,085
150	136,188	13,812
189	170,411	18,589

Theoretical standard error of estimate (see Appendix D)  
= 12.57

Observed standard error of estimate = 12.57

TABLE 12

A comparison of the estimates of the criterion  
with the observed values  
Regression equation no 2

Observed score	Estimate no. 2	Error of Estimate no. 2
102	107,684	5,684
90	104,806	14,806
101	115,720	14,720
84	76,224	7,776
90	81,238	8,762
135	139,642	4,642
64	82,084	18,084
212	186,040	25,960
65	53,135	11,865
73	70,761	2,239
124	133,829	9,829
103	103,595	,595
180	184,903	4,903
81	85,370	4,370
110	100,075	9,925
140	143,587	3,587
109	110,062	1,062
73	68,491	4,509
85	93,828	8,828
89	80,368	8,632
87	79,737	7,263
200	200,422	,422
70	65,605	4,395
77	75,618	1,382
139	143,004	4,004
139	145,002	6,002
190	171,801	18,199
160	165,922	5,922
145	154,781	9,781
128	135,569	7,569
151	148,017	2,983
181	170,145	10,855
164	176,874	12,874
82	89,949	7,949
108	98,453	9,547
168	174,320	6,320
150	148,372	1,628
189	172,971	16,029

Theoretical standard error of estimate (see Appendix D)  
= 9.72

Observed standard error of estimate = 9.72

TABLE 13

A comparison of the estimates of the criterion  
with the observed values  
Regression equation no 3

Observed score	Estimate no. 3	Error of estimate no. 3
102	128,253	26,253
90	128,253	38,253
101	101,172	,172
84	79,507	4,493
90	93,047	3,047
135	147,210	12,210
64	76,799	12,799
212	182,415	29,585
65	33,469	31,531
73	79,507	6,507
124	133,669	9,669
103	95,755	7,245
180	171,583	8,417
81	87,631	6,631
110	87,631	22,369
140	144,501	4,501
109	112,004	3,004
73	63,258	9,742
85	106,588	21,588
89	87,631	1,369
87	82,215	4,785
200	185,123	14,877
70	63,258	6,742
77	84,923	7,923
139	149,918	10,918
139	133,669	5,331
190	176,999	13,001
160	166,166	6,166
145	155,334	10,334
128	141,793	13,793
151	139,085	11,915
181	168,875	12,125
164	147,210	16,790
82	98,463	16,463
108	101,172	6,828
168	160,750	7,250
150	171,583	21,583
189	171,583	17,417

Theoretical standard error of estimate (see Appendix D)  
= 14,93  
Observed standard error of estimate = 14,93

## CHAPTER SIX

## DISCUSSION OF RESULTS

6.1 General

The results obtained in the study were considered in terms of the specific hypotheses, found in section 4.2.2 on page

6.1.1 Accident liability and primary process dominance

This hypothesis ( $H_1$ ) related accident liability to primary process dominance. The primary process dominance was inferred from Rorschach measure, viz., Holt's system of primary process scores. It stated that high accident liability was correlated with

- i. High primary process scores
- ii. High content scores
- iii. High formal scores
- iv. Low creativity scores
- v. Low form level scores
- vi. High aggression scores
- vii. High defense demand
- viii. Low defense effectiveness.

The following significant coefficients of correlation were found:

Score	Correlation <sup>1</sup> with $\bar{t}$
Co	-,612
Agg	-,410
Fo	-,702
%P P	-,935
DE	,847
DD	-,764
FL	,477

(a) Co, in its turn was found to be significantly correlated with the following:

Score	Correlation with Co
Agg	,510
% Pripro	,627
DE	-,492
DD	,505
FL	,325
MZ	-,378
M/FM	-,307
F+%	-,431

---

1. Significant at the 5% level.

- (b) Agg, in its turn was found to be significantly correlated with the following:

Score	Correlation with Agg
% Pripro	,478
M%	-,492
M/FM	-,438
Co	,510

- (c) Fo, in its turn was found to be significantly correlated with the following:

Score	Correlation with Fo
% Pripro	,744
DE	-,636
DD	,693
FL	-,408
M%	-,498
M/FM	-,466
FC%	-,557
FC/CF+C	-,337
F+%	-,586

- (d) % Pripro, in its turn was found to be significantly correlated with the following:

Score	Correlation with Pripro %
DE	-,768
DD	,725
FL	,461



(d) continued.....

Score	Correlation with Pripro %
M%	-,562
M/FM	-,541
FC%	-,489
FC/CF+C	-,335
F+%	-,696

(e) DE, in its turn was found to be significantly correlated with the following:

Score	Correlation with DE
DD	-,722
FL	,425
M%	,401
M/FM	,563
FC%	,494
FC/CF+C	,318
F+%	,740

(f) DD, in its turn was found to be significantly correlated with the following:

Score	Correlation with DD
Co	,505
Fo	,693
% Pripro	,725
DE	-,722
FL	-,473
M%	-,562

(f) continued.....

Score	Correlation with DD
M/FM	-,540
FC%	-,435
FC/CF+C	-,459
F+%	-,602

The accident liability score (f) was low when the driver had a large number of accidents, and *vice versa*, high when the driver was relatively accident free.

The negative correlation with Co implied that liability to have accidents was increased as the number of drive-dominated responses in the record of the subject increased. Klein (1956) said:

*"If experimental conditions are those that produce the dominance of an executive intention, the opportunity is diminished for more peripheral active intentions to project themselves in behaviour."* (Klein, 1956, p. 158)

In a similar way the conclusion can be made that primary process thinking which is peripheral to the executive intent, could overwhelm, to speak the language of Klein, the phenomenal reality and the reaction to the percept. The possibility exists that drivers who have frequent accidents cannot cope with the interference of peripheral unconscious material and their

manner of adaptation is not as good as it should be.

The Fo (formal characteristics of the response) also correlated with t to the extent of  $-.702$ . The formal characteristics of the response referred to the perceptual and language aspects of the primary process response, or in other words the conceptual framework of the response. Subjects who scored a high  $\hat{t}$ , were not so completely dominated by the perceptual configuration that they were no longer capable of critical control of the percept. Fo meant that the subject either distanced himself from the percept to such a degree that his interpretation of it was absurd, or otherwise he was so involved in the percept that he was not able to separate himself from it. In such a case there was also the tendency to turn the stimulus in the Rorschach test into a reality both conceptually and affectively. A subject might have said that he was afraid the crocodile (seen in the card) would bite him.

Aggression (Agg), the third measure in the composite primary process percentage score (Pripro), correlated negatively with  $\hat{t}$  ( $r = -.410$ ). In the light of the literature such a correlation was expected. Parry (1968) suggested that aggression might be an important factor in accident repetition. Holt (1968) stated that aggression probably played an important role in the

dynamics of maladjustment. Aggression as a phenomenon still remains a problem for the scientist. The question has repeatedly been asked whether aggression is an in-born biological urge which becomes manifest in violent or anti-social behaviour, or it is learned as a response to environmental conditions. It is also necessary to know if adequate control would prevent aggression from breaking through into overt acts of hostility. Present day theorists have even suggested that an extra Y chromosome in man might be responsible for aggression.

Silverman and Silverman (1963) have suggested that ego pathology which is seen in primary process thinking was specifically linked to the activation of aggression.

The fact that aggression appeared to a great extent in the responses (note the correlation of ,510 with content) could indicate the great amount of tension of aggression that existed within the subject. As such, it possibly played a part in the maladaptive regression of the subject, though neither DD or DE correlated significantly with Agg. The correlation of aggression with total pripro percentage was ,478. Reference to the perceptual model of Klein (1956) indicated the possibility that aggression existed as unspoken cognitive and affective reactions and also as unconscious fantasies in the reaction to the percept. In the light of this

model, mention could be made of the fact that there was a correlation between aggression and feedback error, the latter being the score in the feedback task that was given to the subjects.

The comments made by Sandler (1971) were considered to be of significance to the above findings. In the first place, Sandler was not happy with the lack of description and explanation of the large variety of phenomena which were subsumed under the general heading of aggression. He felt that it was necessary to differentiate between overt aggression and phenomena like the affects of rage and anger which did not seem to be entirely drive-derivatives. The psychoanalytic school of thought had of course, postulated unconscious aggressive impulses to account for certain overt phenomena of aggression, but in addition there was speculation about the role of aggression in its relation to mastery, motility, etc., (Joseph, 1973; Spitz, 1969). Spitz (1965) said:

*"We speak often enough of the aggressive drive but it is rarely spelled out that the aggressive drive is not limited to hostility. Indeed, by far the largest and most important part of the aggressive drive serves the motor of every movement, of all activity, big and small and ultimately of life itself."*  
(Spitz, 1965, p. 106)

Sandler (1971) pointed out that the introduction of a notion of the "capacity to be aggressive, which

might be considered as an inherited aspect in the human being. The capacity to be aggressive was mobilized and used by the ego in relation to the attempts of the latter to avoid unpleasure. The capacity to be aggressive could exist alongside aggression, which was defined as an instinctual drive. It could be that in the present research project, that both the concepts were encountered. The incidence of aggression in the % Pripro was regarded as being aggression of the instinctual type. Where a driver, however, got angry, as it were, with the apparatus or with the test material in front of him, it could have been regarded as an aggression which served mastery and adaptation rather than destruction. The two concepts might need more clarification in the future.

It was also possible that Sandler's suggestions about the reduction of drive tension might be applied in the research. He specified that reduction of aggressive tension was achieved mainly by feedback, once the aim toward which the aggression had been directed, was fulfilled. When feedback was decreased, or when there was no feedback there was lesser reduction of aggressive tension. It could be that this was the aggressive tension that was manifested in Co and Fo and which correlated with % Pripro positively and negatively with the  $\hat{E}$  score. It could well be for this reason that FE correlated with aggression to the extent of ,533. Here

the driver who was less able at the mechanical task when feedback was diminished, revealed more aggression. There is no reason why the explanation of Spitz (1965) and Marcovitz (1973) should not also be considered here. The greater the threat offered by the intrusion of primary process thinking, the greater the attempt (cf. the correlation with FE of ,533) by the driver to establish, maintain, and expand his boundaries. Marcovitz (1973) said:

*"This process never occurs in a vacuum but always at the interface of opposing forces which are always experienced as limiting gratification and growth and/or as threatening injury or destruction. Asserting one's own boundaries is a basic mode of affirming continued existence."* (Marcovitz, 1973, p. 228)

The libidinal, aggressive and formal characteristics constituted the primary process content. Percentage primary process became a very powerful score. It correlated with  $\bar{f}$  to the extent of  $-.935$ . Several possible reasons might be given to explain why this result was so high. In the first instance, the Rorschach as a test was conducive to primary process thinking. A number of reasons were mentioned in section 3.5.2 above to indicate the susceptibility of the Rorschach to primary process thinking. In the second instance, primary process and secondary process thinking were considered to function within a dichotomy, and there was constant regression in service of the ego. A human being would always have

primary process thinking with him, just as surely as he would have an unconscious structure of the mind. The intensity of the correlation would indicate a greater usage of primary process thinking where feedback is not very active. Noy (1969) pointed out that:

*"...these 'old programs' continue to exist and to regulate various unconscious contents. Their existence and activity are revealed indirectly in such productions as dreams, jokes, art and various psychopathological patterns of behaviour. They show no signs of being influenced by reality, and such basic conditions for reality adaptation as the concepts of time, space and causality, etc., remain forever without relevance for them.*

*As they continue to organize mental contents only in terms of the self, they are labelled 'egocentric' or 'narcissistic' organizational modes, and are regarded as contradictory to any socialization and reality-orientated adjustment and development." (Noy, 1969, p. 174)*

Whereas % Pripro had reference to the amount of primary process thinking present, DD implied the intensity of the primary process thinking in the record. It could possibly have been regarded as a more solid form of correlation with the  $\bar{f}$  score although it was of course also influenced by the amount of pripro in the record. Generally % Pripro and DD followed similar patterns as regards the intercorrelations. There was one exception, viz., DD did not show a correlation with Agg whereas % Pripro did. The records of the subjects contained many evidences of aggression but the aggress-



ion responses were not of a high intensity as regards primary process thinking. The aggression was controlled to a certain degree by the ego processes. (cf. Sandler, 1971, p. 14)

Good drivers appeared to be better able to deal adaptively with the primary process thinking, when it occurred. The correlation of DE with  $\hat{e}$  was ,847. The DE correlations seemed to be an almost perfect complement to the % Pripro correlations. Schafer (1967) wrote:

*"Finally, on the subject of defense, the patient's defensive mobilization during testing will tend to act as a major counterforce with respect to the creative regression previously considered. The interplay of the regressive and counter-regressive forces is often dramatic and instructive."* (Schafer, 1967, p. 22)

The FL score correlated well the  $\hat{e}$ , ( $r = ,477$ ). The FL scores distinguished the various modes of reality adherence of the subject, and was considered a good reflection of the personal style of the subject. The good form response indicated a wealth of past experiences, which supplied the subject with many associative possibilities to match with the perceptual impressions. They showed the sharpness and daring of the perceptual articulation of the subject as he coped

with the features of the blot. Finally, the subject had to make a strict critical assessment of the degree of congruence between his associations and the formal articulations of the blot area. Where the critical functions mentioned above were absent, the driver lacked good normal adjustment and this was reflected in his  $f$  score.

The Mayman Form Level Scoring System was incorporated by Holt (1969) into his scoring system for primary process thinking. As such it was considered in the first hypothesis. They were scored for every response because as Rapaport (1968) maintained:

*"In almost any record, the number of times form alone is used as a determinant by far exceeds the number of times any other determinant is used...a careful consideration of the subject's use of form plays a crucial role in the evaluation of any Rorschach record."*  
(Rapaport 1968, p. 338)

The research proved that the relationship between the form responses scored by the above method and also by the  $F+\%$  method of Beck (1950) with the formal reasoning and contact with reality of the subject, were far-reaching. The results were indicated in the following table.

TABLE 14

## Comparison of F+% and FL correlations

Score	Correlation with F+%	Correlation with FL
t	,782	,477
Co	-,431	-,325
Agg	-,174	-,278
Fo	-,586	-,408
% Pripro	-,696	-,461
DE	,740	,425
DD	-,602	-,473
FL	,288	x
Cr	-,337	-
M%	,446	,382
M/FM	,449	,270
FC%	,608	,275
FC/CF+C	,405	,294
C'/c	-	,193
F+%	x	,288
FE	-,418	-,324

Though a similar pattern of correlations followed for both determinants, it was readily apparent that except in the case of Agg, the FL correlations were somewhat lower than the F+% correlations. In the first instance, the scoring of the FL response varied from reasonably plausible to popular in most cases with a resort to extremes, i.e., sharp, and convincing on the one hand and vague and amorphous on the other hand, being somewhat rarer. This apparently made the score for the total record lower than in the case of the Beck system where the tendency was for more freedom with the F+ response depending on the adequacy of the description, and a tightening of the F- responses. The percentage

score in the case F+ responses would then have been higher than in the case of the Mayman form level scoring system. When the correlation of the Agg with F+% and with FL is considered, it might be that the FL correlation with Agg is higher because the qualitative scoring took aggressive involvement in the form of verbalizations into account more often. Verbalization reflected the subjectivity of the response, and verbalizations in the FL-considered responses implied that the subject was either too close or too distant from the stimulus.

There was more liberality in scoring a response F+ (often the description given during the inquiry established a response as an F+) and this might have caused the F+% to show higher correlations.

Rapaport (1968) has suggested that:

*"...when the F+% is too high, the critical controlling processes may have become rigid and intolerably accurate, making for a meagreness of productivity and for rigidity in thinking and behaviour."*  
(Rapaport 1968, p. 347)

The negative correlation of the F+% (-.377) with Cr might imply that there was too liberal a scoring of F+%.

Creativeness as a score in the system of Rorschach measures for primary process thinking was explained in terms of regression in service of the ego. During regression in service of the ego there occurred a partially controlled lowering of the level of psychic functioning to promote adaptation. Kris (1952) described the concept as being very much responsible for the creativity of the artist. During the inspirational stage, the artist is immersed in archaic and less stable content. He takes the regressive yield, critically scrutinizes it, selects and then synthesizes it to fit into the current reality situation. It has been pointed out that the subject doing the Rorschach test often did exactly the same with the unstructured stimuli. The responses obtained could then be studied in terms of their originality and creativity. Should the criterion score in such a case be some artistic measure, it could well be said that the regression in service of the ego promotes creativity. In the case of drivers of vehicles there was no significant correlation with the creativeness score, except in the case of F+% ( $r = -.337$ ). A possibility which might be considered in connection with the lack of correlation with creativeness was the fact that the range and description of the creativeness criterion were such that the scorer was impelled in most cases to use a rating of three or four points. Pine (1959) reported that generally the studies done in connection with

creativity showed no relation to the currently used measure of adaptive regression, i.e.,  $DD \times DE / PPR$ , nor to the overall measures of the amount or control of the primary process.

### 6.1.2 Accident liability and degree of control

This hypothesis ( $H_2$ ) related accident liability to the degree of control that the subject exercised in his Rorschach responses. The degree of control was inferred from selected Rorschach determinants. The hypothesis stated that high accident liability was correlated with

- i. Low M%
- ii. Low M/FM
- iii. Low FC%
- iv. Low FC/CF+C
- v. High C'/c
- vi. Low F+%

The following significant coefficients of correlation were found:

Score	Correlation <sup>1</sup> with $\bar{x}$
M%	,571
M/FM	,611
FC%	,478
FC/CF+C	,308
F+%	,782

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1. Significant at the 5% level

- (a) M%, in its turn was found to be significantly correlated with the following:

Score	Correlation with M%
Co	-,378
Agg	-,492
Fo	-,498
% Pripro	-,562
DE	,401
DD	-,562
FL	,382
M/FM	,726
F+%	,446

- (b) M/FM, in its turn was found to be significantly correlated with the following:

Score	Correlation with M/FM
Co	-,307
Agg	-,438
Fo	-,466
% Pripro	-,541
DE	,563
DD	-,540
M%	,726
F+%	,449

- (c) FC%, in its turn was found to be significantly correlated with the following:

Score	Correlation with FC%
Fo	-,557
% Pripro	-,489
DE	,494
DD	-,455
F+%	,608

- (d) FC/CF+C, in its turn was found to be significantly correlated with the following:

Score	Correlation with FC/CF+C
Fo	-,337
%Pripro	-,335
DE	,318
DD	-,459
F+%	,405

- (e) F+%, in its turn was found to be significantly correlated with the following:

Score	Correlation with F+%
Co	-,431
Fo	-,586
% Pripro	-,696
DE	,740
DD	-,602
Cr	-,337
M%	,446
M/FM	,449
FC%	,608
FC/CF+C	,405

The accident liability score (f) correlated positively and significantly with all Rorschach determinants which were selected because in some way they indicated control of thinking. There was no exception, namely C'/c, in which case it was assumed that C'/c indicated control over the outward manifestation of emotion.

Consideration of M with regard to delay of gratification has been studied by many writers. Frankle (1955), Mirin (1955) and Tolman and Meyer (1956) reported that subjects who produce many M resort to longer motor delays in their social adjustments. Rapaport (1968) have suggested that since many form elements and



their spatial relationships must be integrated by the associative process, and configurations other than those given in the inkblot must be anticipated, much delay is a prerequisite. Since the correlation of M with the  $\bar{f}$  score is high ( $r = .571$ ) it was assumed that the good driver exerted a control over his thinking so that the entry or intrusion of too much primary process thinking was disallowed. The correlation of M% with % Pripro was  $-.562$ .

The correlation of M/FM with M% was high, being  $.726$ . The pattern of correlations followed the M% pattern very closely, being slightly lower than the M% correlations in all but two cases. The correlation of M/FM with F+% was  $.449$  which was almost equivalent to the M% and F+% correlation of  $.446$ . The similarity could have meant that the FM aspect played no part when M/FM and F+% were compared. The assertion was considered in the light of Piotrowski's (1957) statement that:

*"One of their actual functions is to influence behaviour in states of diminished consciousness. The isolation of the FM action tendencies, which make their appearance in the less integrated states of consciousness, from the personality is not so great that other action tendencies do not influence them."*

(Piotrowski, 1957, p. 198)

A possible conclusion was that both M% and F+% were both such powerful modes of critical control as to disallow entrance of effects of diminished consciousness.

The comment that "the more stable the emotion, the better the form visualization" (Rorschach, 1942, p. 31) was borne out in the correlation of FC% with F+% ( $r = ,608$ ). With the entry of determinants which indicated lability of emotion such as CF and C there was a reduction of the correlation to ,405.

Wittenborn (1950) suggested that the factorial composition of the FC response is quite different from the factorial composition of the CF and C response categories. He went on to say that as a result of his study he regarded the factorial composition of the FC response as more similar to the factorial composition of the human movement response than it is to the other colour response categories. The greater difference between the FC% correlations and the FC/CF+C correlations when compared to the lesser difference between M% and M/FM correlations support Wittenborn's remarks.

The following statements by Wittenborn (1950) were considered appropriate to terminate the discuss-

ion on the degree of control. He said:

*"It was inferred that some of the Rorschach responses differed from each other with respect to the degree of perceptual control characterizing them. Although the exact nature of this control was not and is not clearly specified, human movement responses and large detail responses were conceived as involving a high order of perceptual control whilst whole responses and colour form responses were considered to be alike in that they involve a flexible perceptual approach requiring appreciably less perceptual discipline. A low order of perceptual control is tentatively conceived as manifested by responses which are incautious, possibly spontaneous and or impulsive, to a degree which results in a relative disregard for or an unawareness of, the purely formal, literal or concrete response possibilities. In order to apply this conceptualization broadly, the pure colour, the pure texture, and the pure diffusion response categories may be added to the whole and the colour form response categories. Similarly, in order to broaden the tentatively conceived class of responses which express a high perceptual order, the pure form responses and other detail response categories are added to the human movement and large detail response categories. This hypothesis is proved by factor analysis.*  
(Wittenborn, 1950, p. 266)

### 6.1.3 Accident liability and the amount of feedback

This hypothesis ( $H_3$ ) related accident liability to the amount of feedback. The amount of feedback was inferred from the use in an experiment of a modified version of the Moëde two-hand motor co-ordination apparatus. It was quantitatively represented as the difference in the number of feedback errors made by a subject in two different experimental situations. The

hypothesis stated that high accident liability was related to high feedback error.

The following significant coefficients of correlation were found:

Score	Correlation <sup>1</sup> with feedback error (FE)
t	-,576
Agg	,533
Fo	,376
% Pripro	,582
DE	-,502
DD	,510
FL	-,324
M%	-,605
M/FM	-,498
FC%	-,402
FC/CF+C	-,375
F+%	-,418

The FE score implied that a deprivation of kinesthetic and visual stimulation in a two-hand motor coordination task caused a difference in performance from that occurring when there was no attempt to impose deprivation. It was noted that different individuals responded differently to such deprivation, and that differences here were consistent with other difference in other variables.

Popular writing has made much of the effects of deprivation on the human being. Many quips were made

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1. Significant at the 5% level

about the astronauts for instance and what they said to passing bodies. Scientists like Hebb (1949) have emphasized the importance of environmental stimulation in the development and maintenance of normal behaviour.

It has also been suggested that it was only in cases of severe deprivation that pathology occurred. Nevertheless, there has been general acceptance that there are critical time periods within which sensory accompaniments of a motor response must return to the nervous system for appropriate regulation.

Driving might be regarded as the adaptive consequence of the processing of perceptual information. Bad drivers according to the criterion used in the research made a larger number of errors (FE) than the better drivers. There was a good correlation of FE and % Pripro, namely, ,582. The primary process responses contained significant amount of aggressive but little libidinal content. Aggression correlated with FE to the extent of ,533 and there was no Co significant correlation. From the Fo correlation of ,376 it would appear that the extent of the involvement of the driver in his task was important. Where the driver appeared either too distant from his objects or too closely involved with the objects, there was no opportunity for the correct critical control, and he drove badly. Quenalt (1968) suggested that safe drivers were those who were fully aware of all the relevant information as they drove, whereas the dis-

sociated drivers showed a neglect of relevant presented information.

M% correlated the highest with FE. ( $r = -.605$ ). Many studies have appeared since 1952 concerning the relationship of M to thought, action and delay capacity. Singer (1955) suggested that impulse delay, emphatic motion perception, fantasy, and thinking were interdependent processes. In the test situation in the present research it was noticed that those drivers who did the most amount of turning of the handwheels, were those who made the most errors. A lesser motor activity which was well controlled was characteristic of the drivers who had high  $\bar{f}$  scores.

Writers like Beck (1944), Schachtel (1950), and Bohm (1951) maintained that the M tendencies affected only the mental life of the person and were not in any way manifested in the overt motor behaviour of the individual. Though Klopfer (1942) thought this way in the beginning, he modified his ideas to suggest that the M response touched on all the most important aspects of the well-functioning personality. Piotrowski (1957) pointed out that the individual lives according to his role in life and does not merely fantasy about it. He felt that there was a kind of a psychic energy present in M which expressed itself in the way that the individual

perceives the world, structures it, and related to it.

Generally M% implied the more controlled thinking operations of the mature ego. A control or delay of impulse making for more articulation of thought interposed itself between the activity and its immediately associated thoughts, though the association between the two was never obliterated. All the determinants which gave evidence of the logical control were negatively correlated with FE.

#### 6.1.4 Prediction of accident liability

The results of the statistical calculations included two batteries of the best predictors. In the first battery prominence was given to the Co, Fo, and Agg as scores in themselves rather than as components of the % Pripro. The first battery was arranged in this way to discover if any one of the three components could contribute as strongly to the battery of predictors as % Pripro did.

In the battery chosen from fourteen predictors, DE emerged as the strongest predictor of the accident liability score, ( $r^2 = .719$ ). The DE score indicated to what extent the primary process thinking that occurred in the Rorschach responses was handled adapt-



ively. Fishman (1973) used DE as a valid indicator of adaptive regression. He suggested that the capacity to produce primary process thought in an adaptive manner was a very relevant factor in psychoanalytic therapy. When DE had all its potential as a predictor exhausted, M%, F+%, Co, Fo, Cr, Agg, C'/c, and FC/CF+C were each able to contribute something extra, though increasingly small, to the complete regression equation. When a standard error of estimate was calculated for this equation, it was found to amount to 12,57 days.

At this stage, it was reasoned that the % Pripro was definitely an exceedingly strong score and that another battery of best predictors should be chosen which included % Pripro and which meant that 15 variables were considered. When the regression equation for a battery of 15 predictors had been selected, a standard error of estimate of the accident liability score with the observed value of the accident liability score showed a difference of 9.72 days. The power of % Pripro as the most important predictor ( $r^2 = .890$ ) was noted. When % Pripro was calculated as the only predictor and a comparison of the standard error of estimate of the accident liability score with the observed value of the accident liability score was made, the difference amounted to 14,93 days. The battery of the best predictors based on 15 scores contri-



buted a margin of 5.21 days more than % Pripro did.

The components of the best predictors of the accident liability score selected from 15 predictors were as follows:

1. % Pripro
2. DE
3. F+%
4. Cr
5. FC/CF+C
6. FL
7. M/FM

The importance of % Pripro as the best predictor gave added weight to the first hypothesis which related accident liability to primary process dominance. DE which correlated highly with % Pripro (-,636) has been mentioned above in connection with the best battery of 14 predictors. The study aimed a consideration of treatment planning of bad drivers as a conclusion from the prediction equation and the fact that DE has already been used as a valid indicator of adaptive regression, made its appearance as such an important predictor very important.

The addition of F+% as a predictor was well indicated by Beck (1945) as follows:

*"The F+ potential is thus one of the most important of the Rorschach test factors. It is a measure of the strength with which the personality has organized its values, the force that holds it together when disruption threatens, and the central directive to which it refers at moments of decision. As expressing conscious discrimination and judgment, it represents activity of the higher, the differentiating cortical centers. In so far as this activity refers to a set of values that the personality identifies with itself, it is the central directive that determines the personality's course. The F+ score thus becomes the measure of the stability of the personality. (Beck, 1945, p. 22)*

The entry of Cr into the list of best predictors was surprising particularly as it had not correlated significantly with any of the other 14 scores.

FC/CF+C appeared as a predictor and not FC%. Ames *et al.* (1959) regard the FC as the scoring variable in which growth came slowest and latest and Dworetzky (1956) felt that CF and C gradually began to decline and FC increased from four years onward to puberty. Beck (1945) suggested that CF and C were useful as indicators of inner unrest and emotional instability. The predictor FC/CF+C possibly contributed to the list of best predictor by indicating the level of emotional maturity that had taken place in the individual.

The fact that FL should appear in the list of best predictors in addition to F+% was considered unusual. A

possible explanation for its occurrence was sought in the fact that FL was scored for all the responses and its incorporation with colour, shading or other determinants a nuance of prediction that was additional to the F+%.

The increased entry of FM into the ratio M/FM implied that the perceptions ceased to be evaluated according to the best knowledge and experience, with the result that critical control was not as effective as in the case of M% alone.

## CHAPTER SEVEN

## SUMMARY AND CONCLUSIONS

7.1 Summary

The research project attempted firstly, to ascertain whether drivers who were rational and mature thinkers were less liable to accidents than drivers who were impulsive and immature. The first consideration in this connection was the establishment of a psychological model, which would support the concepts of rational and irrational thinking. Rational thinking was thought to exist when the individual was free to choose personally congenial paths to personally gratifying goals. In these circumstances the person was neither in the grips of drastic unconscious acting out or extreme conforming to reality. Put into different words, this meant that the individual was neither bound by primary process thinking nor by a secondary process thinking which never allowed for any regression in service of the ego.

Following the establishment of a dichotomy of thought processes ranging from extreme primary process thinking to extreme secondary process thinking, the concept of feedback was hypothesized as being responsible for secondary process thinking. Lack of feedback or diminution of feedback caused a corresponding lack of regulation of the secondary process thought function with the result that there was a breakthrough of primary process thinking.

The ability to monitor or regulate, or to establish critical control was equated to the ability to delay gratification or impulse.

The first section of the research attempted to illustrate primary and secondary process thinking in relation to accident liability; and the second to discover whether Rorschach determinants in a perceptual task were indicative of the degree of control of the feedback functions.

In the second part of the research a physical apparatus was constructed to create a diminished feedback situation. It was felt that just as regulation occurred at a perceptual or mental level that it could also occur at a sensory level. Diminished feedback on the sensory level would not only give rise to greater primary process thinking, but would also correlate with accident liability.

Primary process thinking was reflected in the first instance by the amount of drive related imagery in the content, i.e., the extent to which the response contained oral, anal, sexual, exhibitionistic and aggressive images. Secondly, the primary process thinking was reflected in the extent to which the form of the response deviated from logical, orderly and realistic thinking. The degree to which the Rorschach response reflected primary process thinking was called the defense demand, and the extent to which primary process thinking could be integrated into a more realistic and understandable response was called the

defense effectiveness of the response. A creativeness score showed to what extent the subject was able to regress in service of the ego.

The results in this section showed conclusively that the better driver was a more rational and mature thinker.

It was also concluded that Rorschach determinants which had been chosen to indicate the degree of control exercised by the driver, gave evidence of the difference between safe and accident-repeater drivers.

In the case of a psychomotor experiment, arranged to measure errors caused by diminished feedback, it was found that the accident repeaters made more errors and appeared to be hampered by lesser degree of control and more primary process thinking.

## 7.2 Implications for safe driving

Rapaport (1953) reported that the ego's active state led to integrated action while the ego's passive state was helpless in the face of drive demand, and by the paralysis of control. Erikson (1964) added that it was the very essence of the ego to maintain an active state by selective involvement in actualities. He explained actualities as being the world of participation, shared with other participants with a minimum of defensive

maneuvering and a maximum of mutual activation.

The activity and participation ascribed to the ego-oriented person was also considered to be a characteristic of the good driver. The present study has indicated the deliberate and conscious self-control and the lesser intrusion of primary process thinking in the better driver.

Adequate human movement responses have for instance, been taken as instances of the flexibility, versatility of the control with which the driver regulates his activities, including his driving reactions.

Significant results were found for all the hypotheses and the general high correlations attained in connection with the accident liability score was considered an indication of the value that the results might have for accident prevention. The two aspects, selection and therapy need further consideration.

#### 7.2.1 Selection

Tests have been proved to be of value in the selection of drivers. The work of Shaw (1965) is a case in point. She said that tests could fulfil their most important function, namely to predict future accident involvement with a very satisfactory degree of accuracy. Shaw claimed that her testing programme possessed enough sensitivity not

only to distinguish between good and bad risks but also to make shades of distinction within the mediocre-to-bad group. Shaw explained as follows, regarding the method used by the assessors in her experiment:

*"In this system the assessor was merely asked to analyze the projective material by whichever of the methods of analysis he found best suited to his own inclinations and training; then to take a blank card and write a brief description of the total personality picture, and the sort of overt behaviour he felt was likely to result from this pattern. He was then asked to make two separate predictions of the potential of the individual, (1) in terms of accident liability, and (2) of potential as an employee. These ratings were made on a five-point scale."*  
(Shaw, 1965, p. 44)

In the present study, selection would follow along somewhat different lines. In the first instance the projective technique was the Rorschach rather than the T.A.T. Secondly, the training of the assessor was very specific, namely, a background of ego psychology theory for the interpretation of the Rorschach results. A battery of predictors was obtained from scores which were founded in ego psychology theory and a predicted accident liability could be given.

It has been realized that there is a need to test the efficacy of this predictor before it can be established as a useful adjunct in traffic research. Nevertheless



its implications for selection are evident.

In many cases selection follows training over a period of time when there is little expert knowledge of the thought processes of the trainee. The realization that the individual is not a suitable driver often occurs after a disastrous time on the roads.

Similarly, the promotion of professional drivers might be undertaken according to the knowledge gained about the strength of their thought processes.

Mention has already been made of the selecting-out of individuals who are unfit to drive a vehicle. Often the lack of capacity of such individuals becomes apparent as a result of physiological, or psychomotor tests but it will have to be recognised that individuals might have to be selected out by virtue of their inability to control their primary process thinking and the consequent lack of feedback and actualization. Selecting-out might be temporary, for an individual might be willing to seek help to establish better secondary process thinking.

### 7.2.2 Theory

The accident repeater has been represented as an individual whose mode of thinking did not assist him to actualize his psychological reality very effectively.

Inability to delay impulse could be the causative factor in traffic accidents. Irritations cause emotionalism and frustration increases stimulus hunger, and the driver could retaliate with rash behaviour in a high-powered vehicle. The lack of control displayed by the driver in a situation of stress does not differ from the lack of control he would display anywhere else. Lack of feedback and the domination of primary thought processes threaten his security, and in the case of the person with a weaker ego, the attempts at mastery are unsuccessful. The remarks made by Marcovitz (1973) on aggression as self assertion bear reiteration as one recalls the efforts of so many drivers to drive on the white line.

Though very little mention has been made in the literature of any kind of therapy as a *modus operandi* with drivers, it is more than likely that many drivers have had therapy, where they as people have felt that their accident repetition was part of their inability to cope with reality. Tillman and Hobbs (1949) have suggested that the driving habits of the individual and his high accident record are simply one manifestation of a method of living that has been demonstrated in their personal lives. They said:

*"If his personal life is marked by caution, tolerance, foresight, and consideration for others then he will drive in the same manner. If his personal life is devoid of these desirable characteristics then*

*his driving will be characterized by aggressiveness and over a long period of time he will have a much higher accident rate than his more stable companion."*  
(Tillman and Hobbs, 1949, p. 331)

The present study was much concerned with the adaptation to reality of the individual. It was reasoned that the Rorschach was an important instrument in the assessment of ego mastery in the individual and that retesting after a period of therapy could be accomplished very successfully. The great value of the Rorschach in retesting was the fact that it could give an objective measure of changes which occurred. Schafer (1967) said, concerning the changes after therapy, that one could look for:

*"...evidence in the retests of strengthened repressions, reaction formations, and counterphobic emphases, improved accuracy of reality testing, increased ability to stave off intrusions of disruptive ego-centric or autistic preoccupations, decreased emotional lability or inappropriateness, and improved capacity for control, concentration, and conformity with at least minimal demands of convention and social intercourse."*  
(Schafer, 1967, p. 51)

The present study established a battery of the best predictors and it would be possible to use this to see to what extent there could be an improvement in the estimate of accident liability, after therapy.

An attempt has been made to use Holt's Rorschach measures of primary process thinking for test and then retest after therapy. Fishman (1973) did research on the adaptive regression of patients during the first six months of long term outpatient psychoanalytic therapy. He implied that the adaptive regression of the patient was viewed as a factor in enabling the patient to indulge in free associative exploration of inner life leading to enhanced intellectual and emotional self-understanding and in turn also to enhanced functioning outside the therapy in his daily life. The therapy was conducted within a general framework of two aspects of psychoanalytic therapy. Firstly the intra-therapy or process of therapy focussed on the interrelationship between therapist and patient and how the patient talked about his problems. The goals were firstly for the patient to see the connection between his problems and conflicts within himself and secondly to allow utterance to primary process thinking without being overwhelmed by it. The extra-therapy component was to assist in the solving of his actual problems. There was a causal relationship between the two, namely that the greater the adaptive regression skills the more facility in solution of difficult reality situations. He concluded that his study lent validity both to a conception of adaptive regression as an important characteristic of cooperatively in therapy, and to Holt's DE (defense effectiveness) score as a valid indicator of adaptive regression.

### 7.3 Further studies

Arising out of this study were several aspects which warrant further investigation.

- (a) Replication of the study with other race groups
- (b) Test-retest results of accident repeater drivers with a period of therapy interspersed
- (c) The relation of speed to feedback
- (d) The relation of fatigue to production of primary process thinking
- (e) Diminished feedback and the perception of road signs.

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## APPENDIX A

## Calculation of the coefficients of correlation

The Pearson product-moment coefficient was used for the calculation of the coefficients of correlation. Because the work was done on the computer, the following formula was found to be the most convenient.

$$r_{xy}^2 = \frac{N XY - (X)(Y)}{N X^2 - (X)^2 - N Y^2 - (Y)^2}$$

To find  $r_{xy}$  the square root was extracted.

## Calculation of the level of significance

The smallest value of absolute  $r$  which is significant at the 5% level was obtained from the formula:

$$t^2 = \frac{(N - 2) r^2}{1 - r^2}$$

where  $t$  is the 5% critical value of students  $t$ -statistic with  $n - 2$  degrees of freedom.

Thus the level of significance applied in the coefficient of correlation table was

$$t = 2,028$$

$$\text{absolute } r = 0,32$$

## APPENDIX B

Calculation by means of the Wherry-Doolittle method  
of the battery of the best predictors

This method, according to Guilford (1956) offers an efficient way of assembling a battery of variables or tests which meet a particular purpose. From a large number of predictive instruments that are tried experimentally, the minimum number are chosen that might do the job. It is not possible to use the method of factor analysis, because too little is really known about the criterion score to reveal the factors that are worth trying to predict. In the Wherry-Doolittle method a start was made by selecting one variable which seemed to offer the most in prediction of the criterion. The method then aids in selection of the second variable that would have the most to add to prediction when combined with the first. A third would be selected which would add most by way of prediction when combined with the first two and so on.

Two batteries were extracted as follows:

- (a) One from the group of fourteen scores in which pripro taken as a composite score did not figure;
- (b) one from the group of fourteen scores plus pripro.

This was done because it was found that the standard error of prediction of the first battery was only slightly smaller than that of pripro, when pripro as a composite score was used as a predictor on its own.

## APPENDIX C

## Calculation of regression equations

It has been noted in the results that three regression equations were calculated, viz.,

- (a) an equation for the battery of best predictors selected from the group of fourteen scores;
- (b) an equation for the battery of best predictors selected from the group of fourteen scores plus pripro as a composite score;
- (c) pripro as the only predictor.

The equations for (a) and (b) follow from the following equations:

$$\begin{aligned}
 &W_{cc}Z_o + W_{13}z_3 + W_{14}z_4 \dots \\
 + &W_{113}z_{13} = 0 \quad \text{and} \\
 &W_{cc}Z_o + W_{12}z_2 + W_{13}z_3 \dots \\
 + &W_{115}z_{15} = 0 .
 \end{aligned}$$

where

$W_{ij}$  is the co-factor of  $r_{ij}$  in the correlation matrix, and

$z_i$  is the predictor score in standard units. A standard units. A standard unit is defined as

$$z = \frac{x - \mu}{\sigma}$$

where  $x$  is the raw score

$\mu$  is the mean

$\sigma$  is its standard deviation.

The equation for (c) follows from:

$$Z_o = rz_4$$

where

$Z_o$  is the estimated criterion  
score in standard units,

$z_4$  is the observed pripro  
score in standard units,

$r$  is the coefficient of  
correlation between the  
criterion and pripro.

## APPENDIX D

## Calculation of standard error of estimate

The equation for the standard error of estimate is as follows:

$$S^2 = \frac{W}{W_{cc}} \times S_c^2$$

where

$W$  = the determinant of the correlation matrix

$W_{cc}$  = as above

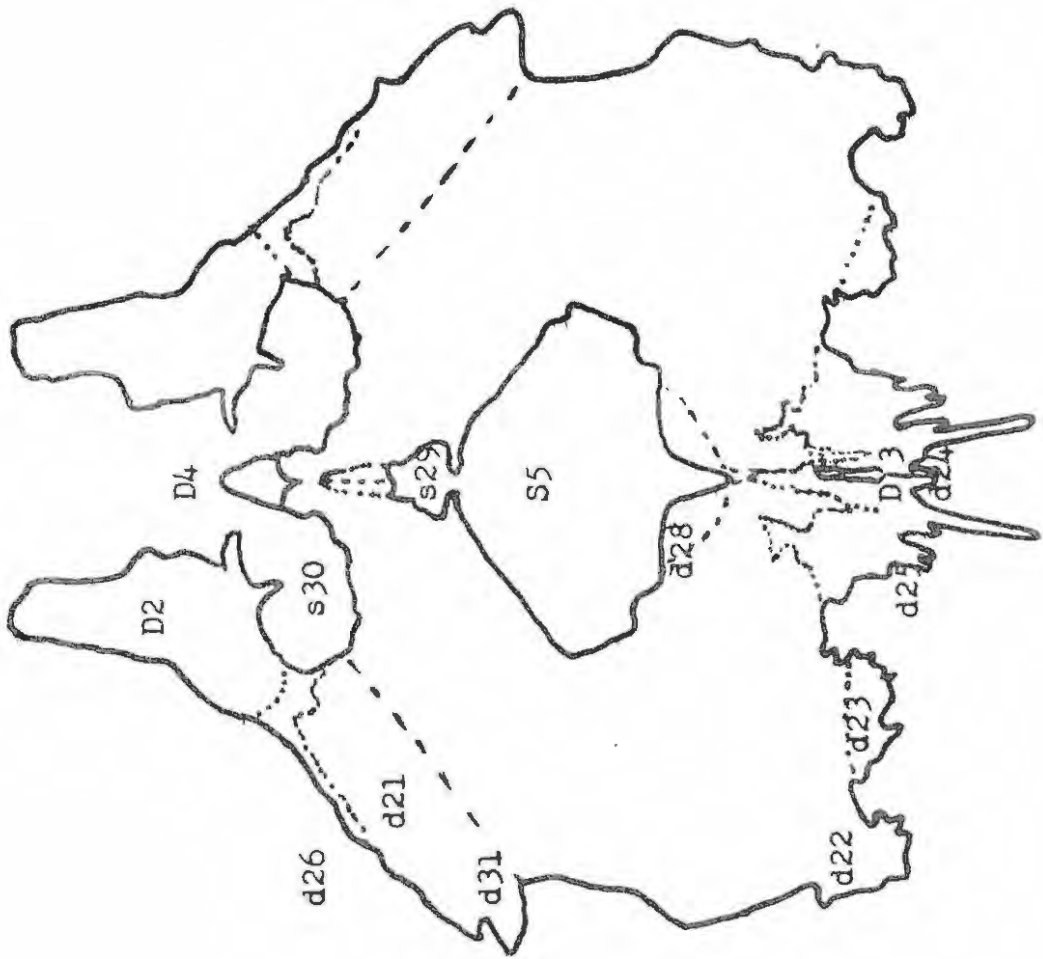
$S_c^2$  = the variance of the criterion score.

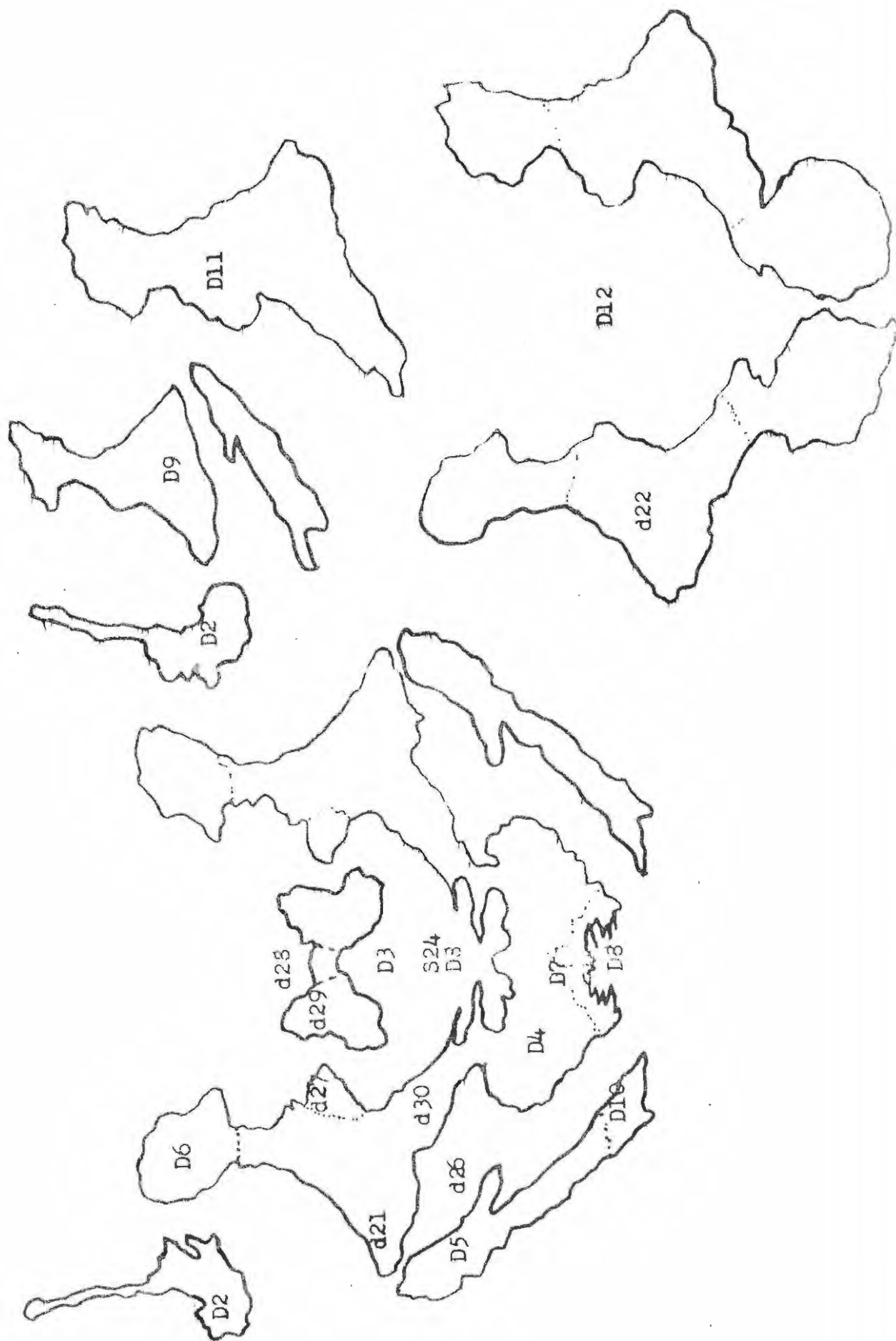
The standard error of estimate is the standard deviation of the observed values from their corresponding estimates (i.e., the corresponding points on the regression line). In formula form this would be  $S$

where

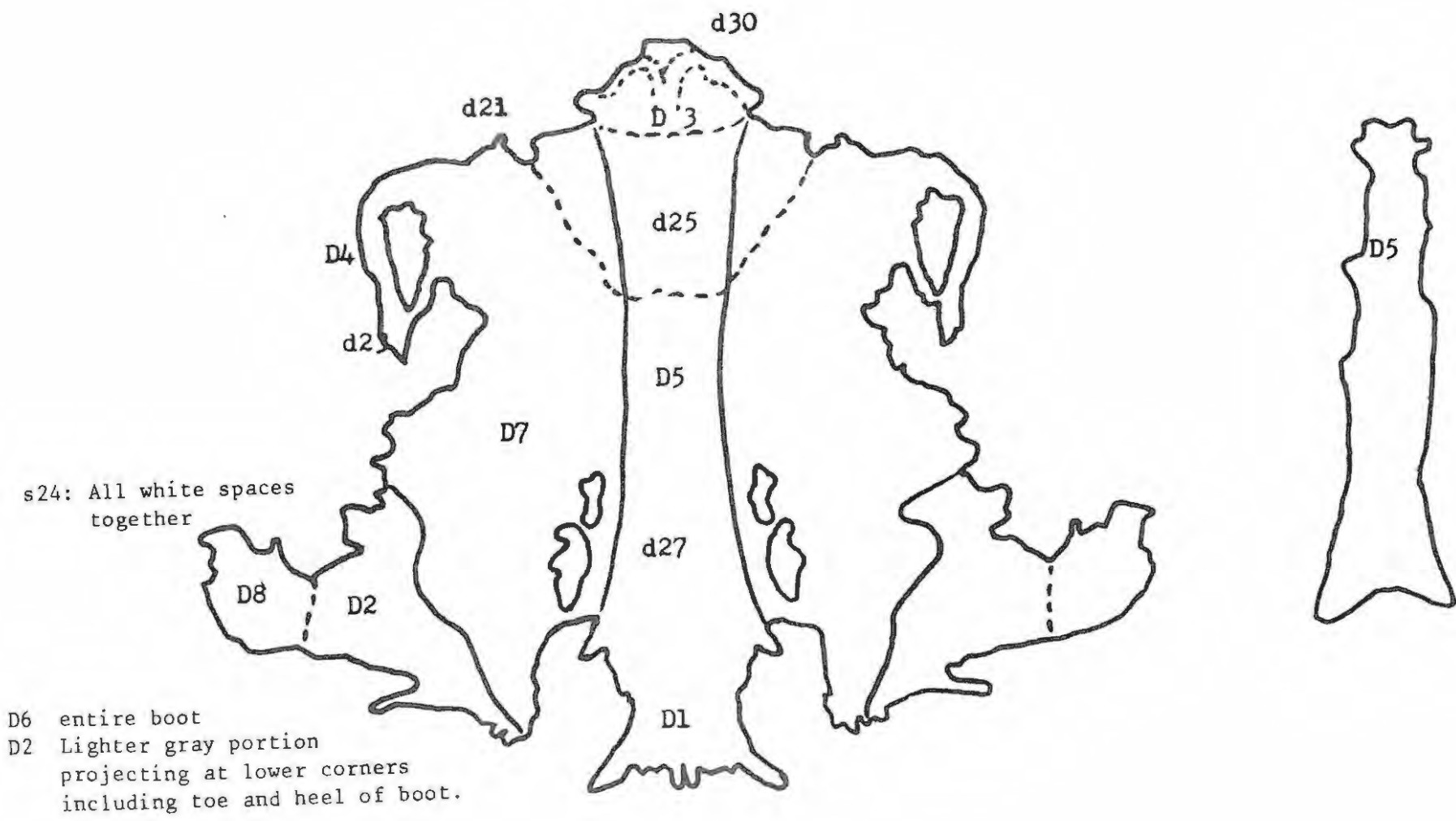
$S^2$  = the sum of (estimated value - observed value)<sup>2</sup> divided by the number of observations.

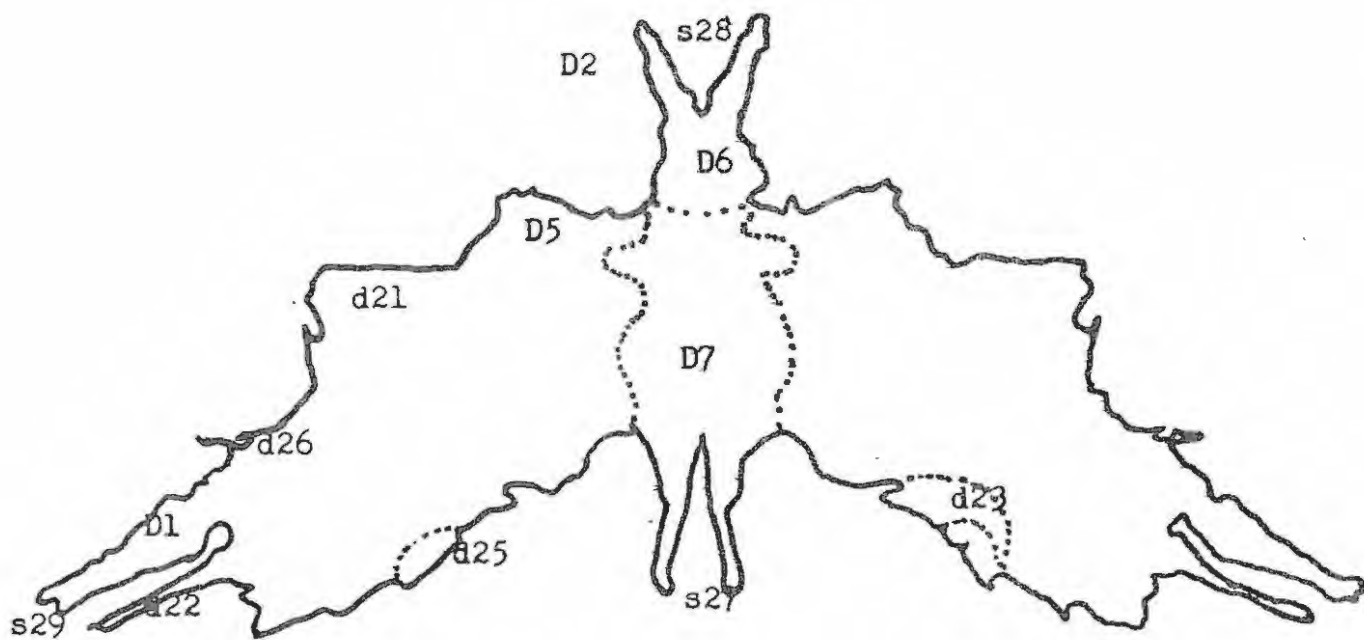




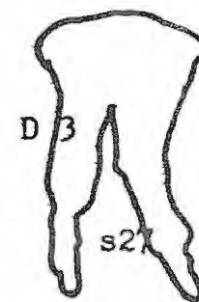




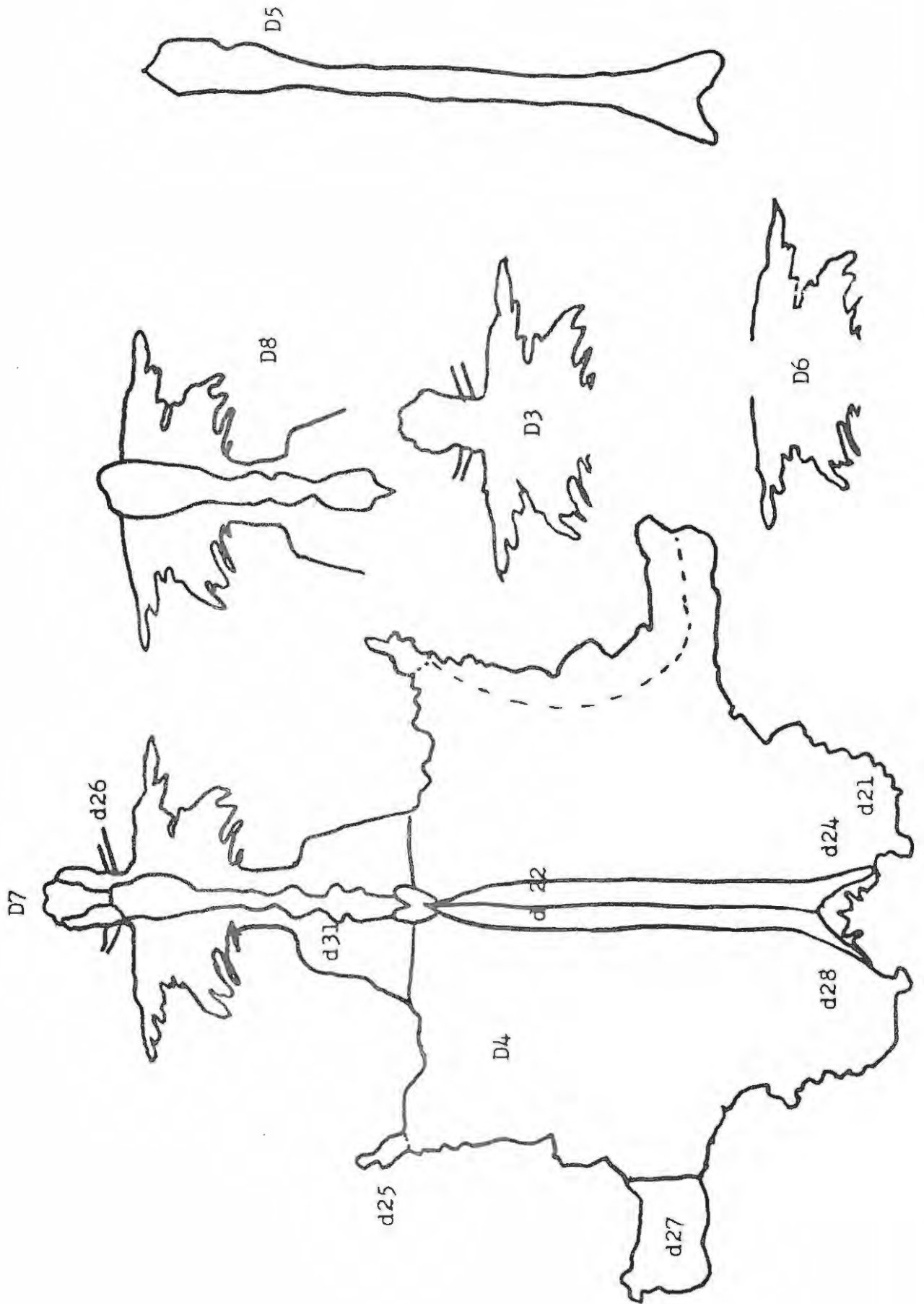


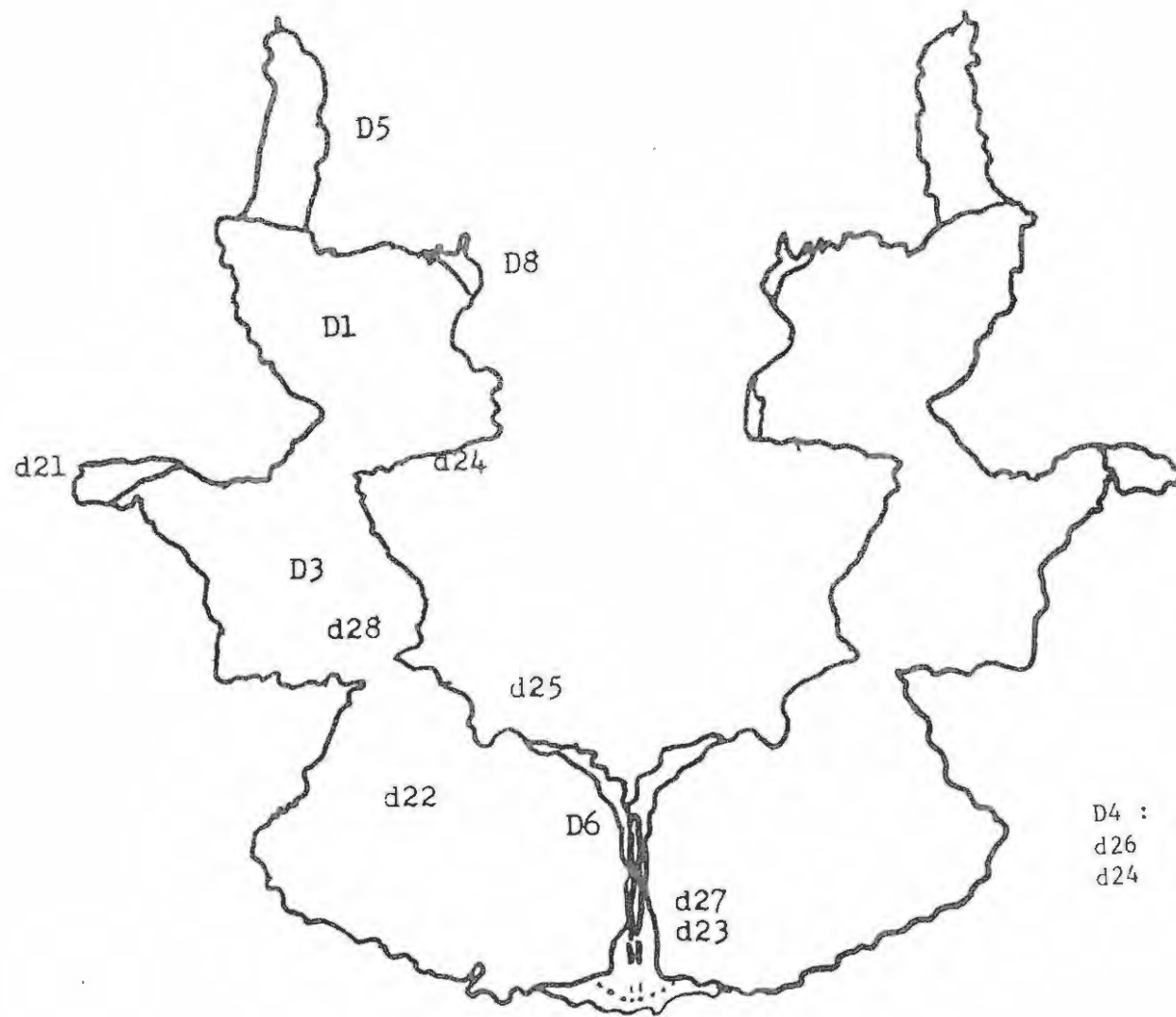


d23 : lower edge, beginning at D3 and extending to d22



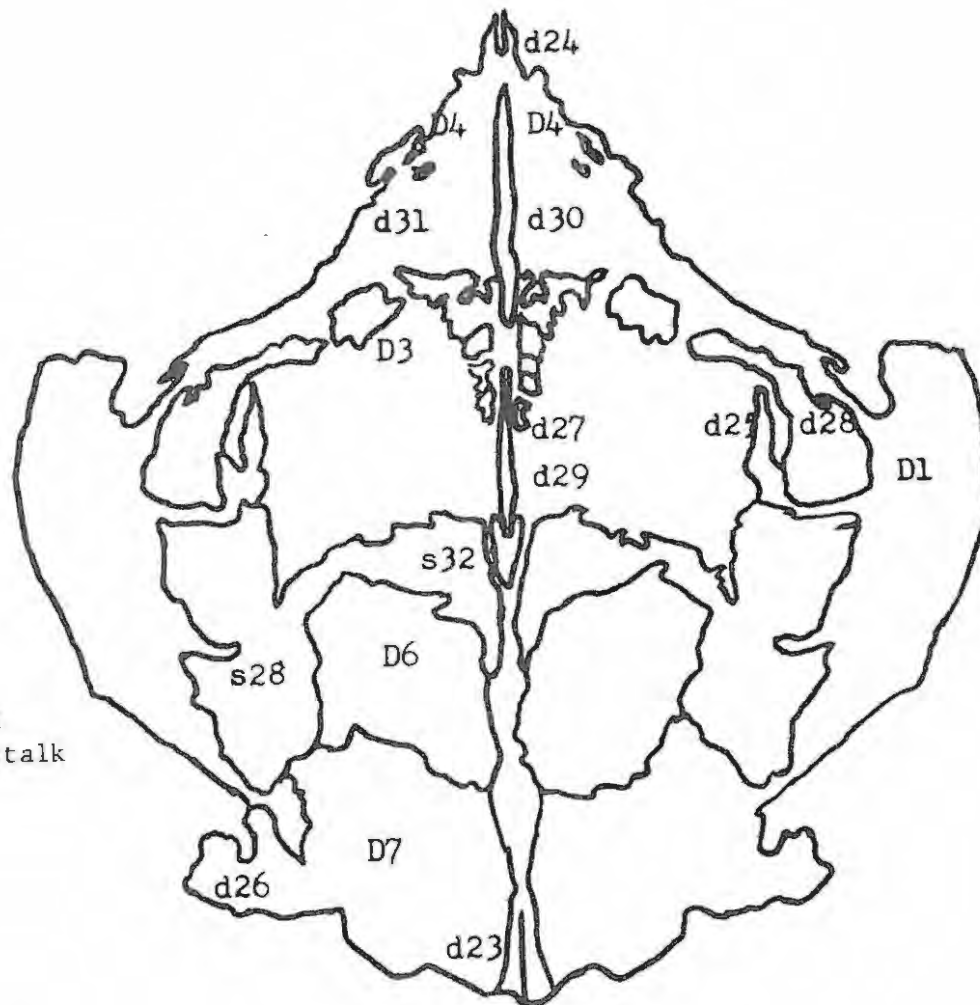
D9 ( D3 + s27 )

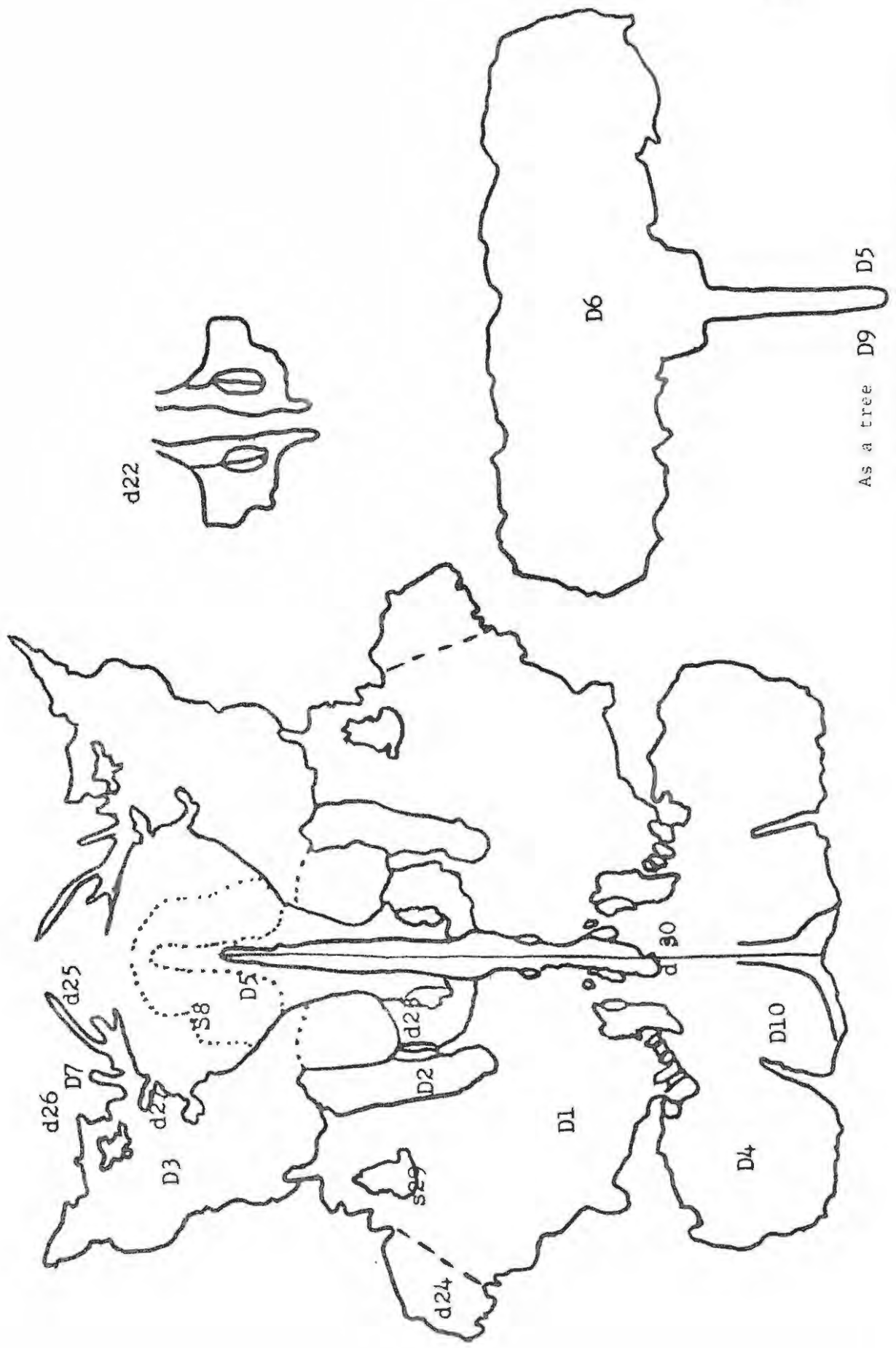




D4 : Both d22 as one (+ D6)  
 d26 Gray d in middle of D6  
 d24 darker lower D1

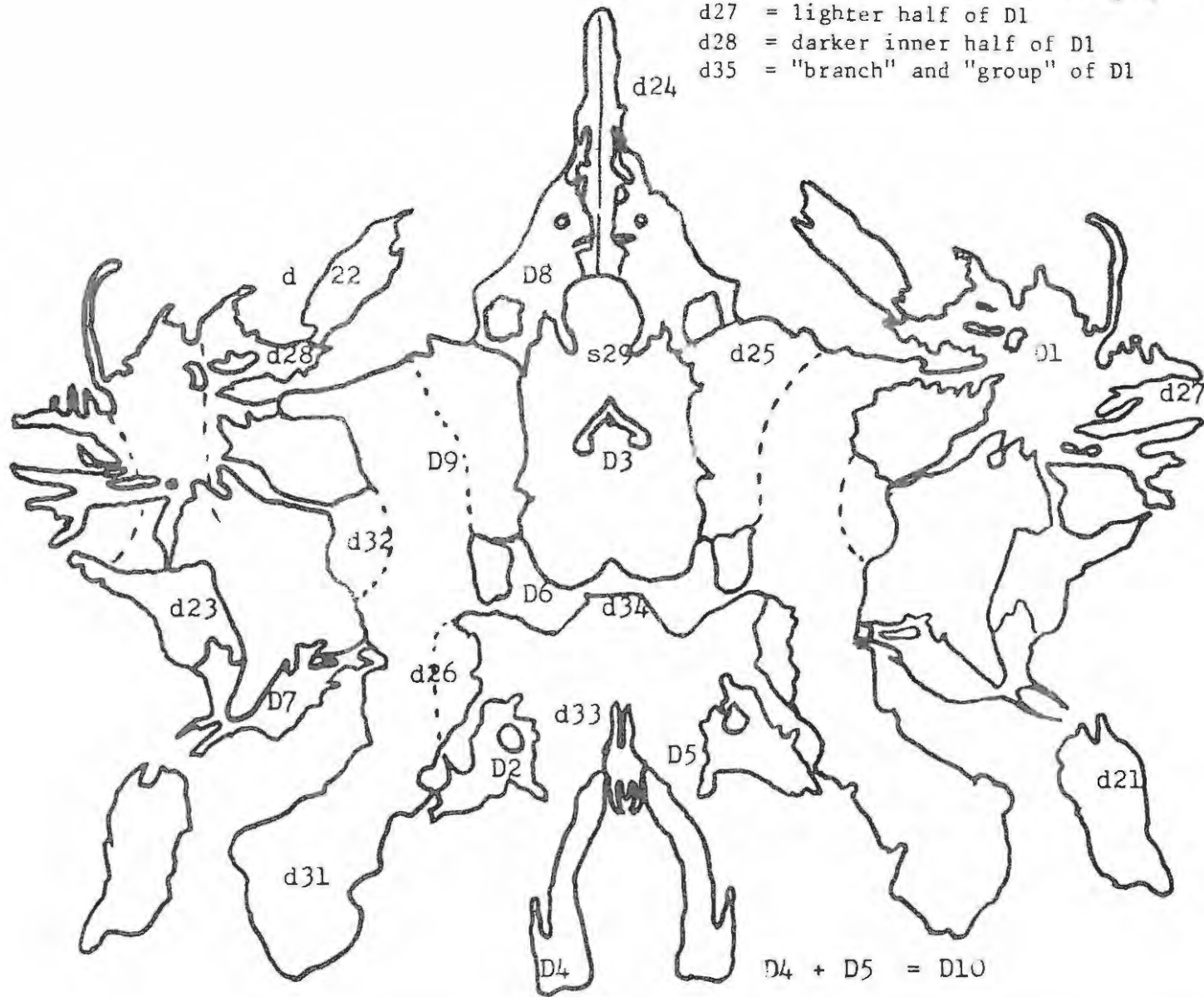
D4 + D5 = D8  
D3 or S3  
S3 when white included  
d21 entire mid-green stalk

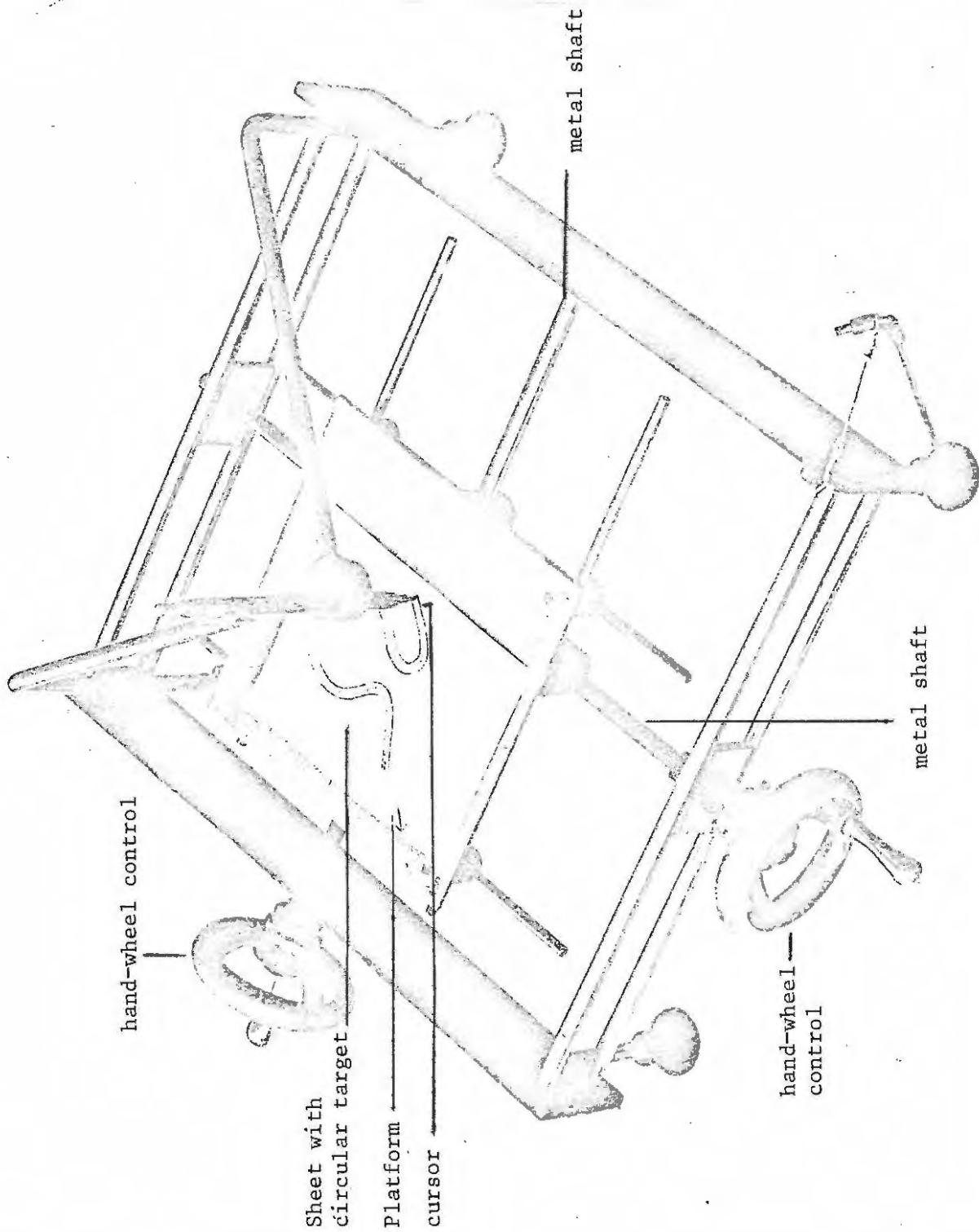




As a tree D9 D5

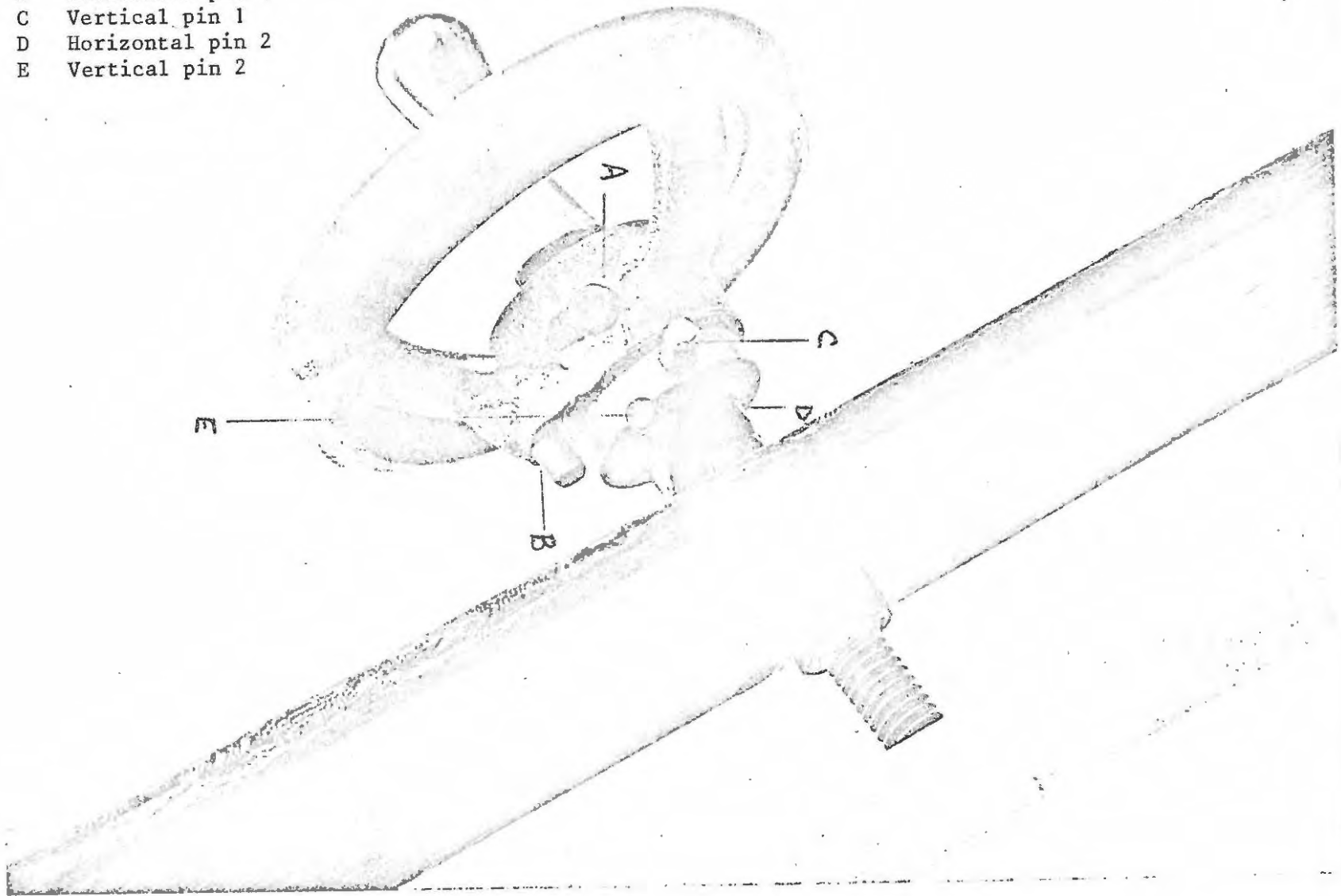
D11 = D8 + d24 (seen as one entire grey cluster at top)  
 d27 = lighter half of D1  
 d28 = darker inner half of D1  
 d35 = "branch" and "group" of D1







- A collar space for key
- B Horizontal pin 1
- C Vertical pin 1
- D Horizontal pin 2
- E Vertical pin 2



## APPENDIX G

TABLE<sup>1</sup>

Description of the experimentees  
according to the accident liability score

Driver No.	l	r	r + l	t
1	1021	9	10	102
2	269	2	3	90
3	1213	11	12	101
4	841	9	10	84
5	903	9	10	90
6	540	3	4	135
7	642	9	10	64
8	850	3	4	212
9	910	13	14	65
10	1025	13	14	73
11	622	4	5	124
12	927	8	9	103
13	1260	6	7	180
14	810	9	10	81
15	882	7	8	110
16	1121	7	8	140
17	875	7	8	109
18	367	4	5	73
19	510	5	6	85
20	269	2	3	89
21	697	7	8	87
22	2001	9	10	200
23	703	9	10	70
24	387	4	5	77
25	976	6	7	139
26	977	6	7	139
27	568	2	3	190
28	481	2	3	160
29	581	3	4	145
30	1024	7	8	128
31	606	3	4	151
32	1267	6	7	181
33	1147	6	7	164
34	736	8	9	82
35	969	8	9	108
36	504	2	3	168
37	601	3	4	150
38	756	3	4	189

1. l = exposure to risk  
r = number of accidents during the exposure time  
t = the accident liability score

## APPENDIX H

## Responses and scoring of the Rorschach Test.

Example: Driver No. 34

Card 1

- a. 5s. Beetle (D4 body; d22 shading for the eyes;  
u d22, D1 feelers; in a resting position;  
looking down on the top of the beetle; the  
shading forms a design on the back of the  
1 beetle; the male used to make a dung ball  
and the female lays the eggs in the dung  
ball; I like snakes.)

Co: L 2 A  
Fo: -  
DD: 2  
DE: 1  
FL: -1  
Cr: 3

D: F+: A

- b. 30s Hammerhead shark (D2, d21 part of the head  
1 and body; I can see the tip of the nose  
and the eye; he is rolling in the surf;  
a kind of a dangerous customer.)

Co: Ag 2 PS  
Fo: -  
DD: 2  
DE: 1  
FL: -3  
Cr: 4

D: FMV: A

- c. 41s Two birds (In flight; d21 tip of the wing;  
u D2 the wing; D5 is the tail; the head has  
a crest; it is flying over a crag.)

Co: -  
Fo: -  
DD: -  
DE: -  
FL: -1  
Cr: 4

Dd: FM: A

- d. 47s Chicken (Day-old chick; black dot is the  
r eye; d25 another chicken eye; still in  
the nest peeping out.)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: -2  
 Cr: 3

d: FMV: A

60s

Card 2

- a. 15s Bear's head (Reaching up at something;  
 u,r, D1, d31 ears; d28 paws; they are nice old  
 d. chaps.)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: 1  
 Cr: 2

Dd: FM: A

- b. 39s Butterfly (D3 wings on either side; it  
 1,r, could be resting; it is a reddish butterfly;  
 quite nice.)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: -1  
 Cr: 4

D: FC: A

- c. 49s Socks (D2 both sides; bed socks; design  
 1 on the middle and the other toe; the socks  
 are pulled down and over; Demonstrates.)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: -1  
 Cr: 4

D: F+: Obj, Cl.

- d. 85s Calf (D1, d26 mostly the head of the calf;  
d horn protruding from forehead; sucking at  
1 breast; will definitely be a bull;  
breast bone protrudes more in the bull calf;  
he will grow up to be a black Taurus bully  
love bull.)

Co: L 2 0  
Fo: VP 2; Aut E1 2  
DD: L 2 0 (3); VP 2 (3); Au E1 2 (3)  
Total 9  
DE: -2  
FL: 0  
Cr: 3

D: FM: A

- e. 110s Top (D4 pin has come out of this top;  
spinning in an upright position; the edge  
is wavery because it is spinning.)

Co: -  
Fo: -  
DD: -  
DE: -  
FL: 1  
Cr: 4

D: mF: Obj.

120s

Card 3

- a. 30s Bushman (D6 bust etc.; head with beard;  
r upper lip protruding; nose flat and up-  
d turned; lash of eye sticking out; frizzy  
hair.)

Co: L 1 H  
Fo: -  
DD: 4  
DE: 1  
FL: 1  
Cr: 4

D: FC'c: H

38s

- u Bearded head (D11, d30; white patch is eye;  
saintly look to reform the world; sucking  
a pipe; d27 is beard; hasn't a care in the  
world.)

Co: L 2 0  
 Fo: DW 1  
 DD: 6  
 DE: 1  
 FL: -1  
 Cr: 3

Ds: Mc: H

- c. 49s Monkey (D2 sitting on the ground; tail is  
 u out in front of him; head is turned; some-  
 thing has attracted his attention.)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: -1  
 Cr: 3

D: FM: A

- d. 68s Squirrel (D2 tail is curled behind him;  
 u looking at something on the ground.)  
 r Now its a rat climbing a tree.

Co: -  
 Fo: Trans 1.  
 DD: 3  
 DE: 1  
 FL: 1  
 Cr: 4

D: FM: A

- e. 81s Night owl (d22 wing outstretched; d21 is  
 d the beak; the white patch is the eye;  
 l it is flying away.) Away old to-whit!

Co: -  
 Fo: Aut E1 2  
 DD: 2  
 DE: 2  
 FL: -2  
 Cr: 4

ds: FM: A

- f. 94s Trees (D6 their branches are moving slightly.)

u Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: 0  
 Cr: 3

D: Fm: Bot

125s.

Card 4

- a. 5s Coral (D3 and top of D7 small pieces of  
u coral are protruding; it has a shell and  
l the coral is growing on the shell; now  
d it looks like a witch with a hat and  
stringy hair; the dark shading is her  
cloak.)

Co: Ag 2 PS  
Fo: Trans  
DD: 5  
DE: -2  
FL: -1  
Cr: 3  
D: F+: A,H

- b. 70s Bear rug (D1 is hind part, d23 the legs,  
l d30 the tail; the top part has been fol-  
r ded under; is moth-eaten around the  
l head.)

Co: Ag 2 R  
Fo: -  
DD: 2  
DE: 1  
FL: 1  
Cr: 3

D: FC': Ad

- c. 82s Possum (D4 is the head; the tail is up-  
right and it stands next to a tree. The  
tail is not bushy enough - it is alert,  
looking for graze; its time for mine'.)

Co: L 2 A  
Fo: S - R 1  
DD: 4  
DE: 1  
FL: -1  
Cr: 3

D: FM: A

90s.

Card 5

- a. 60s A vampire bat (W it is flying because the  
u wings are outstretched; D2 are the feelers;  
l got strong claws for gripping;) Not so nice!

Co: Ag 2 AS  
 Fo: -  
 DD: 2  
 DE: 1  
 FL: 1  
 Cr: 4

W: FM: A

- b. 64s The bat changes to a butterfly (Whole ex-  
 1 cept for D1, d22; it is in flight; there  
 d is a dark line down the back; D7 is the  
 body.) A nicer one!

Co: -  
 Fo: Trans  
 DD: 3  
 DE: 0  
 FL: 1  
 Cr: 4

W: FMC': A

- c. 73s Head (D4 egg-shaped head with a rooster's  
 1 comb on top; big ear to the back of the  
 u head; an old viking helmet - the bottom is  
 obscured by a collar.)

Co: -  
 Fo: C-co 2, Trans  
 DD: 5  
 DE: -1  
 FL: -3  
 Cr: 3

D: F-: Ad, Obj.

- d. 80s Tweezers (D3 open position with two prongs;  
 1 slightly bent as a caliper; thumb and  
 d fingers seem joined on an gripping the  
 tweezers.) Strange!

Co: -  
 Fo: Ca-1 2  
 DD: 3  
 DE: 1  
 FL: 1  
 Cr: 4

D: F+: Obj., Hd.

- e. 151s Lamb's leg (D1 hind leg of a lamb, with  
 u its protruding toes; now there is a white  
 line that is a skewer and the leg is now  
 a roasted leg on the skewer.) Nice!



Co: L 2 A  
 Fo: Trans  
 DD: 4  
 DE: 1  
 FL: 1  
 Cr: 4

Ds: F+: Meat, Obj.

Card 6

- a. 30s Monstrance, chalice (d22 is stick; D7 is  
 u the crucifix fitted into the stick at the  
 1 point.) A beautiful picture.

Co: L 2 O  
 Fo: -  
 DD: 2  
 DE: 1  
 FL: -1  
 Cr: 2

D: F+: Cere., Obj.

- b. 50s A bear rug (D4, d27 and d23 the main  
 d portion, front legs and hind legs; skin  
 has been stretched and dark shading rep-  
 represents a brown bear; head has been re-  
 moved.)

Co: Ag 2 R  
 Fo: -  
 DD: 2  
 DE: 1  
 FL: 1  
 Cr: 4

W: FC': Ad

- c. 79s Rocket (D7 rocket going into orbit; d22  
 1 is the dark smoke trail; shading on the  
 side is the glow from the rocket; a peace  
 and war weapon.)

Co: -  
 Fo: Ctr. L 1  
 DD: 3  
 DE: 1  
 FL: -1  
 Cr: 2

D: FC'm: Obj., Fire, Smoke

- d. 101s Dolphin's head (d27; it looks for fish  
u but this one has a bun in his mouth.)

1  
d Co: Ag 2 AS  
r Fo: Ctr L 1  
u DD: 4  
DE: -1  
FL: -1  
Cr: 3

D: F+: A

- e. 112s Totem pole (D7 top part is the head with  
1 two horns; a wise, rather friendly Indian  
chief; the pole is set on a hill; in war  
the banners contain eagle feathers - not  
war now.)

Co: -  
Fo: Aut E1 2, C-co 2  
DD: 4  
DE: 0  
FL: -1  
Cr: 4

D: F+: Cere

121s.

Card 7

- a. 10s Pigtailed (D5 bow on both sides; hair is  
u standing up.)

Co: -  
Fo: -  
DD: -  
DE: -  
FL: 1  
Cr: 4

D: Fc: Hd

- b. 21s Animal face (D3 on the right hand side;  
d very furry neck.)

Co: -  
Fo: -  
DD: -  
DE: -  
FL: -1  
Cr: 3

D: Fc: Ad

- c. 91s Monster (D3 - on the left hand side; large  
d teeth and ferocious eye. Going to attack.)  
This is a good one!

Co: Ag 2 AS  
Fo: -  
DD: 2  
DE: 1  
FL: 1  
Cr: 4

D: FM: A

- d. 99s Lioness (d22 no mane so it must be a  
u lioness; the head is heavy and thick but  
no mane; could be the head of a fox ter-  
rier; watching carefully.)

Co: Ag 2 AS  
Fo: Trans  
DD: 5  
DE: 1  
FL: 1  
Cr: 4

D: FM: A

- e. 110s A growling bear (D3 stalking something;  
1 also a big fierce dog; rather furry, too.)  
u

Co: Ag 2 AS  
Fo: Trans  
DD: 5  
FL: 1  
Cr: 4  
DE: 1  
D: FMc:A

235s.

Card 8

- a. 90s Animal, a rodent (D1 long and furry; bas-  
u hing at something with his paw.)  
r

Co: Ag 2 AS  
Fo: -  
DD: 2  
DE: 1  
FL: 1  
Cr: 4

D: FMc: A

- b. 80s Butterfly with outstretched wings; pretty  
d design and colour on wings; feelers are  
across two pretty flowers.)

Co: L 2 S  
Fo: C a-c u2  
DD: 4  
DE: -2  
Fl: -1  
Cr: 3

D: FC: A, Bot.

- c. 150s Dangerous stingray (D4 swimming in the  
u water; looking up at him.)

Co: Ag 2 PS  
Fo: -  
DD: 2  
DE: 0  
FL: 0  
Cr: 3

D: FM: A

- d. 180s Butterfly (D6, D7 four sets of wings;  
1 beautiful colours; it is a male because  
he has a longer body than the female.)

Co: -  
Fo: -  
DD: -  
DE: -  
FL: 1  
Cr: 4

B: FC: A

189s.

Card 9

- a. 30s Hippo (D1 Head only; not a rhinoceros  
d because it doesn't have a horn. Waving  
head sleepily - sort of come and join  
me style.)

Co: -  
Fo: Au E1 2  
DD: 2  
DE: 0  
FL: -1  
Cr: 4

D: FM: A

- b. 57s Head of a leguan (D2, d22 lovely colour;  
1 it could be the mouth of a dragon; it  
has a sleepy eye; its the head of the  
leguan because of the colour.)
- Co: -  
Fo: C p-f 1  
DD: 3  
DE: -1  
FL: -1  
Cr: 4
- D: FC: A
- c. 64s A monster (D1 he has the west wind in his  
1 cheeks.)
- Co: Ag 1 PS  
Fo: C a-c u2  
DD: 5  
DE: -1  
FL: -2  
Cr: 3
- D: F-: A, Confab.
- d. 78s Dinosaur head (D2, D3 not a bad type)  
u
- Co: -  
Fo: -  
DD: -  
DE: -  
FL: -2  
Cr: 3
- D: F-: A
- e. 128s Doll's head (D4 a bonnet is tied around  
u the head; it is made of crimplly material.)  
1
- Co: -  
Fo: -  
DD: -  
DE: -  
FL: -2  
Cr: 3
- D: F+: Cloth.

f. 76s A wishbone (D4 just that shape.)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: -1  
 Cr: 3

D: F+: Ad

g. 136s A statue of some kind (D5 just between two things - thats all.)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: -1  
 Cr: 4

D: F-: Cere.

159s.

h. 156s A toby fish (d24 just the face of the fish)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: -2  
 Cr: 4

d: F+: A

325s.

Card 10

a. 6s A carpet design (W; the many different colours strike one immediately.)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: -3  
 Cr: 3

W: CF: Obj.

- b. 20s Two strange creatures (D1 can see an eye and legs; I don't know what they are but they could represent loneliness.

Co: -  
 Fo: 1 Sym 2  
 DD: 1  
 DE: 0  
 FL: -3  
 Cr: 3

D: F-: A

- c. 56s Two flower petals (D9 just the colour; could be orchid petals.)

Co: -  
 Fo: -  
 DD: -  
 DE: -  
 FL: -1  
 Cr: 4

D: FC: Bot.

#### Scores obtained

No. of responses:	48
No. of responses containing primary process thinking:	30
No. of responses containing primary process content:	20
No. of responses containing primary process aggressive content:	12
No. of responses containing primary process formal aspects:	22
Total DE score:	19-10 = 9
Total DD score:	102.
Total FL score:	27
Total Cr score:	166

## Representation of scores according to scoring categories:

% Pripro	63
Co	,42
Fo	,48
Agg	,25
DE	,30
DD	3,40
FL	,56
Cr	3,5
M%	2
M/FM	,06
FCZ	11
FC/CF+C	5
C'/c	,80
F+%	66



## APPENDIX I

Scoring on the modified version of the Moëde two-  
hand motor coordination test.

Example: Driver No. 34

Normal feedback task

Trial 1	16,5
" 2	11,5
" 3	10,0
" 4	12,0
" 5	12,5
Total	62,5
Average	12,5

Diminished feedback task

Trial 1	22,5
" 2	19,5
" 3	21,0
" 4	12,5
" 5	13,0
Total	88,5
Average	17,7

Feedback error score =  $17,7 - 12,5 = 5,2$ .