THE MODIFICATION OF CRIMINAL PERSONALITY THROUGH MASSED LEARNING BY PROGRAMMED INSTRUCTION

by

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Abstract

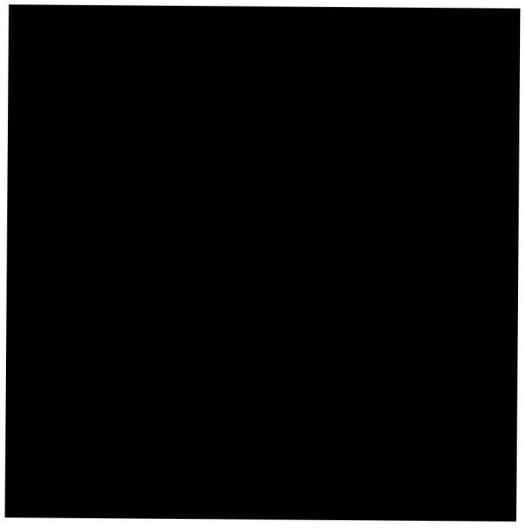
This study investigated the possibility that the personality patterns of criminals could be modified through massed learning by programmed instruction. Programmed instruction was presumed to be the important variable in the case of a number of previous researches reporting behavioural changes after correctional education.

Four groups of penitentiary inmates, N = 64 were administered Form B of the 16 Personality Factor Test. One group, N = 18 was exposed to massed learning by programmed instruction. A second group N = 18 in the same institution as the programmed instructioned group, was exposed to the general duties and vocational training plans of a minimum security institution. Two further groups in a medium security institution were used as controls. One group N = 14 was involved in traditional type academic education, and one group N = 15 was involved in the general duties of the same institution. At the same time as the 16 PF was administered, a Hidden Figures Test of cognitive style was given. After a period of 90 - 95 days the same tests were re-administered.

Predictions were made as to the personality factors which would be found to be deviant from the general population mean, and further predictions were made as to which factors were likely to be modified by the massed learning programme.

Analysis of covariance procedures and t-tests indicated that the predictions made were accurate to a large extent. It was found that the penitentiary inmates had lower emotional control, lower super ego strength

higher anxiety, and higher level of tension than the general population. Furthermore, there was some statistical evidence which indicated that after a period of massed learning by programmed instruction the experimental group showed changes to normality on all of the factors found to be significant for criminality. The control groups showed no changes during the period of the experiment except for one group which made significant changes in the deviant direction on two personality factors.



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Chapter One

The study which follows stems from a five year observation of the results of massed learning through programmed instruction in a correctional institution. It was observed that there seemed to be a low rate of recidivism in those inmates who had been exposed to such massed learning in comparison to those inmates who had not been so exposed. An additional background reason for the study was that over the past two or three years there have been a number of reports from U.S. correctional institutions telling of low return rates after exposure to various programmed instruction systems.

A further reason for this study is the fact that there is very little reliable data available in the correctional education area. Nobody has published precise documentation of the effectiveness or ineffectiveness of correctional education. There are a number of reports which state that 'significant improvements' have followed correctional education but such reports are not supported by adequate statistical data or adequate research design.

Glaser (1966) has commented on correctional education and has pointed out that when success is equated with post-release convic-

tions for felony there are conflicting reports. Some researchers report fewer convictions after correctional education while others report more convictions after correctional education.

Much of the research deals with academic gains made during correctional education, and this sort of research although of some value is no indicator of post-release non-criminal success. In any case there does not appear to have been any controlled research in the area of correctional education by programmed instruction.

In considering correctional education two problems emerge. The primary problem is the question of whether or not correctional education leads to reformation and a reduction in the rate of recidivism. The secondary problem is concerned with whether the offender who chooses or is willing to embark on a programme of correctional education is of a different personality type or is of a different criminal type to the offender who does not choose to embark on an educational programme. The primary problem leads to a consideration of a method of evaluating correctional education in terms of reformation and reduced recidivism.

It would appear that the simplest method would be to keep a central register of all prisoners who received a correctional education and then tally off those re-appearing in the prison and compare the percentage returning with the percentage of non-educated recidivists. Unfortunately, ex-prisoners are more than usually mobile and the required information is not easily obtainable. Another method of examination or the effects of correctional education must, therefore, be sought.

The secondary problem; the question of whether an offender who chooses or accepts correctional education is of a different type to those who do not do so is a more difficult problem to answer. If there are personality differences between the two groups of inmates, correctional educated vs. non-correctional educated, those differences may be revealed by personality measuring devices. If the crime pattern and number and nature of offences differs between the groups this may also be open to assessment. However, there may be subtle differences which are not amenable to measurement or to classification.

It is possible that the criminal personality is of a specific type conforming to certain personality factor patterns, and that those specific patterns may be revealed and measured by appropriate instruments. It is also possible that personality patterns are modifiable and if there are modifications then those modifications will also be measurable.

In effect, the suggestion is that if correctional education is a reformative and rehabilitative process, then rehabilitative or reformative trends may appear in the personality profile over a period of time, and if such modifications appear then they may be measurable.

One of the problems which appears in the research dealing with correctional education is that it does not seem as if a random sample of criminals is included in the research and this same criticism may be justifiably levelled at this study also. However, certain steps may be taken to offset a non-random sample and this matter will be dealt with in a later chapter.

Speculation on the personality of criminals and reformation of criminals bring to the fore a number of major considerations. In this study the problems which seem to be particularly relevant are:

1. What are the salient features of reformation, and in what ways may reformation be brought about? This is the same as asking what the salient features of the criminal or delinquent personality are and how may they be modified.
2. As programmed instruction has been used in penal settings with reported substantial reductions in recidivism, is that reduction in recidivism a result of programmed instruction or are there other variables involved?
3. If the lowered rate of recidivism is the result of programmed instruction is there any significant change in the measured personality before and after exposure to programmed instruction. Further, if there are changes in the personality pattern, are those changes in any way connected with the cognitive or coping style of the individual, and may that cognitive style be subject to modification?
4. Are there any changes in the personality of criminals not exposed to massed learning by programmed instruction? Is there a change of personality in those inmates exposed to academic instruction by traditional methods? Is there any difference between the cognitive style of these inmates who get into the school

situation and those who do not do so.

Definition of Terms

Recidivism

The return of a criminal to a life of crime and imprisonment after a prison sentence has been completed.

Reformation

The change which takes place in a convicted criminal leading to a return to society without further trouble with the law.

Personality

Those factors set out and measured by Cattell's Sixteen Personality Test (16 PF).

Personality Change

A significant change in the score for factors measured by the 16 PF.

Inmate

A male person, currently a ward of the federal government undergoing a sentence of imprisonment for longer than two years.

Cognitive Style

Individual consistencies in cognitive behaviour resulting from an individuals perceptual and conceptual organization of the external environment, and which may be measured by the Hidden Figures Test.

Minimum Security Institution

The William Head Institution, a non-walled penal institution in which the inmates have a great deal of physical freedom. The inmates of a minimum security institution differ from those in other institutions in that they are not considered to be likely to effect an escape.

Medium Security Institution

The Matsqui Institution for Drug Addicts. An institution with a fair amount of custodial surveillance.

Correctional Education

Academic education carried out in the prison, penitentiary, or reformatory setting. As a general rule correctional education is in the form of upgrading in English, Mathematics and General Science to the Grade X level.

Chapter Two

This chapter will be devoted to a review of the pertinent literature in the field under study. As there is little published research which bears directly on this field, i.e., programmed instruction and personality change, much of the review material is only indirectly related.

The Personality of Criminals

Many theories of criminality have attempted to set the offender apart from his fellows and to classify him as abnormal or paranormal. Cesare Lombroso (1911) postulated that the criminal was a throw-back to a more primitive level of evolution, and for a time his utterances were given credence.

Later, Johannes Lange (1930) after studying the patterns of identical and fraternal criminal twins concluded that criminality was the result of defective biological inheritance. E.A. Hooton (1939) followed a similar course of enquiry and argued that the criminal is biologically inferior. It is of passing interest to observe that this argument is by no means defunct and has emerged recently as an observation that criminals have an extra chromosome.

Following a similar search for a unitary causation of criminality, W.H. Sheldon (1940) proposed that personality as well as poten-

tiality may be predicted from somatic conformation. He follows the earlier work of Kretschmer (1925) in that he classifies all persons into three physical categories - endomorphic, mesomorphic and ectomorphic. Sheldon's thesis is that on the basis of these three body types and variations on the types, reliable predictions may be made about the individual's behaviour patterns.

The Glueck's (1950, 1956) classical studies on delinquency have supported Sheldon's arguments in that they assert that body build and delinquency are correlated to a far greater degree than is generally acknowledged. On the other hand, Vold (1958), has dismissed the theory of body build and crime entirely. He indicates that, so far, there is no evidence that physical type has any consistent relationship to legally or sociologically defined crime.

There are any number of theories linking criminality with environmental effects and inborn defects. In this study neither of these aspects will be dealt with directly, rather the personality patterns as they exist within the criminal will be examined and modification of such patterns will be discussed at some length.

At the present time, the most commonly used instrument for the measurement of personality in institutions is the Minnesota Multiphasic Personality Inventory (MMPI). It is an instrument of the self-report type with which the personality may be assessed in terms of a number of factors, usually nine.

Hathaway and Monachesi (1953), using the MMPI reported that a large proportion of boys who tested out as having excitable, rebellious

and schizoid traits were known to the police as delinquent. However, an even larger number of boys whose tests were incomplete or invalid were also known to the police as delinquents. This perhaps may lead to the suspicion that inability to complete or write a valid MMPI is more an indicator of delinquency than the triad of traits mentioned. Semeonoff (1966) has suggested that the length of the MMPI questionnaire, and the face triviality of some of the questions may bore the adventurous delinquent and make him unwilling to complete the test.

The MMPI leans heavily on psycho-analytic constructs, and such constructs tend to be dependent as much on semantics as on the behaviour of the testee. Cattell (1957) suggests that the MMPI measures surface traits only, rather than deep intra-personal constructs. The MMPI has been strongly criticized for the unreliability of some of its scales (Anastasi, 1961). Gilliland and Colgin (1951) report that the test-retest reliabilities over a short period average .61.

Hathaway and McKinley (1944) have suggested that the criteria applied to other psychometric tests cannot be applied to personality tests because many traits are highly variable and test re-test variability is because of trait variability rather than a fault of the instrument. However, split-half reliability has also been shown to be very low, and in this case there would be no trait fluctuations (Welsh, 1952).

Adcock (1965) and Lingoes (1965) have suggested that the greatest limitation of the MMPI is its lack of sensitivity in discriminating within normal or abnormal groups. Although the MMPI is of undoubted value in making broad nosological distinctions between neurotics and psychotics it

is weak in drawing the distinction necessary in dealing with criminality. Partly for these reasons the many summaries of MMPI data from criminal populations will not be dealt with in this study.

Personality Factors in Delinquency

Pierson and Kelly, using a much simpler form of personality inventory than the MMPI, the High School Personality Questionnaire, have presented evidence that neuroticism is not associated with delinquency (Pierson and Kelly, 1963), and Cattell and Ebert's (1963) studies of the 16 PF profiles of criminals and neurotics show that there are subtle, but unmistakable differences between the neurotic personality and the criminal personality. Pierson and Kelly (1963) report that the average for the entire delinquent population of Washington state as being below normal in level of anxiety.

Pierson, Pierce and Cattell (1966) indicate that there are four principal factors of personality involved in delinquency. In the Cattell (1949-1963) classification system the four factors are: Factor E, Submissiveness vs. Dominance; Factor G, Super Ego Strength High vs. Super Ego Strength Low; Factor I, Tough-mindedness vs. Tenderminded; Factor Q_3, Undisciplined Self-conflict vs. Controlled.

Factor E is a clustering of the following components:

E+	Dominance vs Submission	E-
Self-assertive, confident	vs	Submissive, unsure
Boastful, conceited	vs	Modest, retiring
Aggressive, pugnacious	vs	Impunitive, intropunitive
Vigorous, forceful	vs	Meek, Quiet

The person who scores high on E Factor, as do most delinquents, is self-assured and independent minded. He tends to be a law unto himself, hostile or extrapunitive, authoritarian whilst at the same time disregarding authority. On the other hand, non-delinquents who excel in sporting and competitive activities and are original and creative, also have high E scores in the personality profile.

Factor C, which is critical in both the delinquent and criminal profiles, is the most consistently low factor for both groups. It is a clustering of the following components:

C+	Expedient vs Conscientious	C-
Persevering, determined	vs	Quitting, Fickle
Responsible	vs	Frivolous, immature
Insistently ordered	vs	Relaxed, indolent
Attentive to people	vs	Neglectful of social duties
Emotionally stable	vs	Changeable

The person who scores low on Factor C tends to be unsteady in purpose, and is often casual and lacking in effort for group undertakings and cultural demands. His freedom from group influence may lead to anti-social acts, but at times makes him more effective. Refusal to be bound by rules causes the person with a low C score to suffer less from the somatic effects of stress. It is of interest to note that university professors along with delinquents and criminals attain low C scores.

Factor I is found to be high in delinquents and is sometimes referred to as the femininity factor. It seems to be contradictory that the tough delinquent is found to be more feminine than the general run of the male population but makes the narcissism of the delinquent more understandable. Factor I is made up of a clustering of the following personality components:

I+	Tender-minded vs Tough-minded	I-
Demanding, impatient	vs	Emotionally mature
Dependent	vs	Independent minded
Gentle, sentimental	vs	Realistic
Likes to be with people	vs	Self-sufficient

The final factor of significance in delinquency and criminality is Q_3, self-sentiment formation. It is a significant feature of both the criminal and delinquent personality profile, and is an almost invariable low point in the drug addict profile. It is composed of a clustering of the following components:

Q_3+	Undisciplined vs Controlled	Q_3-
Socially precise	vs	Careless of protocol
High self-concept	vs	Low self-concept
Self-respect	vs	Careless

Persons scoring low on Q_3 tend not to be concerned with will control, and exhibit very little regard for social demands. They are not

overly considerate, careful or painstaking. They may feel maladjusted, and many maladjustments (especially the affective but not the paranoid) show Q_3 low.

In addition to the above factors Cattell (1963) reports that convicted criminals show departures from the norm on Factors O and C. Factor O, guilt proneness, is composed of the following components:

O+	Apprehensive vs Placid	O-
Worrying	vs	Self-confident
Depressive	vs	Confident
Troubled	vs	Serene
Insecure	vs	Secure
Guilt prone	vs	Placid

Factor C is a most important factor in criminality and is an indicator of the continuum of emotional stability. A low C score is very usual in convicted criminals. Factor C is broken down into the following component parts:

C+	Emotionally Stable vs Emotionally Less Stable	C-
High Ego Strength	vs	Lower Ego Strength
Faces Reality	vs	Affected by Feelings
Calm	vs	Easily Upset
Mature	vs	Immature

A most significant finding in both the Washington survey of Pier-

son and Kelly (1965) and the Cattell (1963) survey of 891 convicted criminals was the low score on Q_3, self-sentiment formation. This concurs with the many findings that a poor self-concept is indicative of and a predictor of delinquency. (Reckless, Dinitz and Murray, 1965; Scarpatti, Murray, Dinitz and Reckless, 1960; Schwartz, 1956; Coombs and Taylor, 1952).

The Pierson and Kelly (1965) study entailed the High School Personality Questionnaire results of over a thousand juvenile delinquents. Cattell (1965) in an analysis of these data proposes that if a youth is delinquent despite high ego strength Factor C and self-sufficiency, Factor Q_3, the probability of change from delinquency is low; they are poor parole risks.

Torrance (1965) suggests that delinquency may be linked with divergent thinking. In his Minnesota study he found that many early school grade children assessed as divergent thinkers were often regarded by their teachers as being the children most likely to come up with the best ideas for 'being naughty'. Studies by Will (1964) and Patrick (1955) have supported Torrance's contention that the delinquent is frequently a divergent thinker.

Torrance concludes that the divergent thinker with behaviour problems is likely to have three major impediments in thought processes. First he comes to a premature closure or actually thinks of too few alternatives, that is to say, that there appears to be a high quantity of thought but not a high quality. Second, he fails to think through the details of a plan causing even a good plan to fail or result in delin-

quent behaviour. Third, he fails to test or revise his hypotheses, as he is eager to reach a rapid conclusion.

This type of behaviour which Torrance refers to as premature closure is similar to Lemert's (1953) 'closure theory' and perhaps is related to cognitive style. Lemert in a study of forgers proposes that there are certain types of offences which may be termed naive forgery. He contends that many persons guilty of this offence have found themselves in crisis situations, and without any deep knowledge of crime turn to forgery as an expedient to get themselves out of the stressful situation; this expediency is termed 'closure' be Lemert.

Reckless (1955) discussing Lemert's closure theory states that closure may well be applicable to many other offences than forgery which arise from stress situations:

> The closure theory has several advantages. It brings together in a centripetal series of concentric circles the pressures of the situation and the pressures within the person, so that it explains how the individual takes a certain route in his behaviour among available alternatives. (p.74)

It would seem that closure is contingent on either personality patterns or the inability to cope with situations of a stressful nature.

Summary of the Findings on Criminality

Cattell (1966) has indicated (See Appendix A) that delinquents, including sex delinquents, are likely to be characterised by the following factor score patterns: Factor B, Intelligence - attainment of scores lower than the population mean by more than one full sten; Factor H, Shyness - lower than the population mean by greater than one full sten;

Factor L, Suspiciousness - higher than the population mean by greater than one full sten; Factor Q_3, Self-Concept - lower than the population mean by greater than one full sten.

On the same data review, criminals are identified as being characterised by deviances from the population mean on the following factors: Factor B, Intelligence - lower than the population mean by one full sten; Factor C, Emotionality - lower than the population mean by greater than one full sten; Factor F, Surgency - lower than the population mean by one full sten; Factor G, Super Ego Strength - lower than the population mean by one full sten; Factor M, Autia - higher than the population mean by one full sten; Factor O, Guilt Proneness - higher than the population mean by one full sten; Factor Q_4, Anxiety - higher than the population mean by greater than one full sten.

It appears that Cattell's (1966) data is not fully supported by the reviews cited, and, in fact, there is no written research which explains some of the deviances. Factor E is not included as departing substantially from the norm in Cattell's data, yet the review literature is specific on the point that delinquents are invariably high on Factor E, Dominance. Factor I, Femininity does not appear to be characteristic of either criminals or delinquents in Cattell's data and yet the research has clearly indicated that delinquents are high scorers on the continuum tough-minded tender-minded (femininity). On the other hand Cattell's data indicates that delinquents score high on Factor L, Suspiciousness, a finding which is not supported by the literature. In the case of criminals both Factor F, Surgency and Factor M, Autia are shown as significant in Cattell's data, and yet nowhere in the research is such a find-

ing substantiated.

The findings of the researchers discussed in this chapter and the data put out by Cattell (Appendix A) may be tabulated for convenience as follows:

Table 1

Factors considered specific to Criminals and Delinquents by Cattell and other Researchers

Factor	Cattell		Researchers	
	Criminals	Delinquents	Criminals	Delinquents
C	-	1	-	1
E	1	1	+	+
G	-	1	-	-
I	1	1	-	-
O	+	1	+	1
Q_3	1	-	-	-
Q_4	+	1	1	+

+ = above the population mean of 5.5 stens
- = below the population mean of 5.5 stens
1 = not considered

In this study the focus has been on the related research and on the findings of the various researchers and not upon the data which Cattell has derived from institutional settings. Cattell's data is derived from a small number of cases; delinquents: twenty-three males and one hundred and four females; a very small number of males on which to draw conclusions about a male population; criminals: 891 cases, all males. On the other hand the related research in many cases has dealt with large groups; in one case, with the delinquent population of an entire

state. As the focus has been on the related research rather than Cattell's data the work which follows is posited on the research rather than on Cattell's data.

Cognitive Style

As the focal concern of this research is the modification of personality through the cognitive processes, it is essential that an attempt be made to clarify and review that which has been studied on the impact of cognition on personality.

There is a school of research which perceives that there is a cognitive structure, a construct used to help in understanding individual differences, serving as a defence and as a system which permeates all of the individual's functioning and behaviour. This cognitive structure appears in various studies in different guises which may be subsumed under the general term cognitive style.

One cognitive style which has been investigated by Klein (1954) is labelled constricted control, as distinguished from flexible control. This labelling is similar to that which Witkin (1965) has used to cover cognitive functioning - global as opposed to articulate. The labels constricted and global cover the tendency of some individuals to perceive experience as diffuse and whole. There is no perception of detail only an amorphous experience. Flexible, and articulate, on the other hand, connote that there is a tendency for experience to be delineated and structured. The separate components of the experience are perceived as being discrete.

Kelly (1955) posits a similar paradigm of personality in his

theory of constructive alternativism. In this he theorizes that the essential characteristic of man is that he construes his environment by giving meaning to the phenomena which he faces. He uses the term cognitive complexity to refer to the degree of differentiation in the system of constructs used by an individual in understanding his world. Inherent in this is the premise that the individual may use either a few gross constructs in interpreting the phenomenal world or he may interpret his world in finely drawn meanings.

In each of these three outlines of cognitive style the authors are dealing with two extremes of cognition: the diffuse and the particular. They are important, for it may be that the key to personality differences lies in the cognitive style. This may be the same as perceptual style, for as Secord and Backman (1964) say: 'perceivers capable of subsuming diverse concepts under a single broad term were able to see the diverse traits of a person as congruous with each other'.

It would seem from the above that it would be possible to account for the seeming inconceivable differences in behaviour and personality of siblings reared in the same environment in terms of differences in cognitive style. It is possible that some emotional instablity, criminality and other aberrant behaviours may stem from the fact that the global or diffuse character is unable to plan analytically for contingencies. It seems possible that stability of a sort would be a concommittant of complete globality but that some emotional instability might be concommittant with slight globality.

Gardner and others (1959) in discussing cognitive style use the term levelling which they define as 'a low degree of articulation of

stimulus field'. Their contention is that levelling impedes the inclusion of new stimuli into the dominant organizational field.

The converse of levelling has been investigated by Holzman and Klein (1956) under the term 'sharpening'. In sharpening there is a maximal complexity and differentiation of the field. Their work indicates that there is a necessity for sharpening in order that there shall be an organization of a sequence of stimuli. They propose that the levelling type of person would be characterized by muddled thinking and consequent haphazard and disorganized activity because of his lack of sharpening or articulation of stimuli.

It has been shown by Rappaport, Gill and Schafer (1945) and by Schafer (1948) that there is an association between repression and levelling. Subsequent empirical studies by Gardner and his associates (1959) demonstrate that there is a close connection between repression as a defence mechanism and the levelling process. It appears from these two studies that if there is no sequential organization of stimuli, clarity of cognizance of events will be impeded, and there will be no clear understanding of the vicissitudes of life. The individual will be unable to satisfactorily cope with events and may take a deviant way out of a difficult situation.

Of interest when considering the personality of criminals is Klein's (1954) research in which the term constricted-flexible control is used as descriptive of cognitive style. The terms are used to describe differences in response to stimuli which contain ambiguous or contradictory clues. Constricted control subjects tend to set up counteractive measures to offset the disruptive effect of intrusive clues. In

this cognitive style, distracting stimuli are ignored in favour of salient, easily confirmable stimulus attributes. Subjects described as constricted control resolve their conflicts through the mediation of the most obvious external stimuli. This would accord with the findings of Lemert's closure theory.

Witkin, Lewis, Hertzman, Machover, Meissner and Wapner, (1954) in an early study of cognitive style, adduce the field dependence - independence principle in connection with personality and mental health. They found (p. 469) that field dependent people (global) tend to be characterized by passivity in dealing with the environment, unfamiliar with, and fearful of their own impulses over which they have poor control. They lack a good self-image and have a relatively primitive and undifferentiated body image. Independent performers (analytic), on the other hand, show activity and independence in relation to the environment. They have better control over their impulses and have a relatively high level of self esteem.

The research seems to indicate that the global (dependent performers) type is more apt to take an immediate and obvious way out of a stressful situation than the analytic type. It may be presumed that as the criminal takes an easy way out of his situations of stress or need, and that as his crimes are frequently naive that he may very well be of the global type. This would lead to the question of whether or not the cognitive style may be subject to modification and if the style is modified whether it would lead to a change of behaviours.

Programmed Instruction

Programmed instruction would seem to be particularly suited to penitentiary settings according to the many educators working in the field (McKee 1962). There is some evidence that programmed instruction may be superior to standard classroom procedures as measured by learning scores and by economy of time. In a rather old research Silberman (1962), reviewing fifteen researches on programmed instruction, reports that nine of fifteen studies favored programmed learning over conventional methods insofar as learning scores were concerned, and all fifteen researches reported an economy of time in the case of programmed instruction. Other researchers have disputed this finding and have reported no differences in time economy.

McKee (1963-64-65-66-67-68) has carried out a series of experiments using programmed instruction at the Draper Institution, a maximum security prison at Elmore, Alabama, under the auspices of the MHDA. At the Draper Institution there is large scale programming of both academic and vocational courses, with some of the courses being written by inmates. He has reported great improvements in attitudes and a decrease in the rate of recidivism. Much of McKee's research deals with reinforcement contingencies and reinforcement schedules but he has not as yet adequately reported any data regarding personality change.

Brett (1964) has reported findings which are similar to those of McKee. His data and research is relevant to delinquent youth and is limited to academic and social manners instruction in programmed format.

He asserts that there was an improvement in educational standing greater than that which was observable concurrently in conventional classroom situations used as controls. He also reported that concommitant with the increased educational performance there was a generalized improvement in behaviours and a decrease in disciplinary problems.

Schwitzgebel (1964) working with severely delinquent youths at the Streetcorner Centre carried out operant conditioning and the programmed Driver's Code with some measure of success, particularly with delinquents who had been unable to qualify for a driver's license because of inability to pass the written test. Although the work of Schwitzgebel is widely cited as a conditioning and programmed instructional method of changing behaviour, a careful reading of his researches fails to reveal that his work and reported success owes very much to either operant conditioning, a term which he uses rather loosely, or indeed to programmed instruction. There is too little evidence given in his research to allow the assumption that either programmed instruction or operant conditioning are vital elements in the reported successes.

Cohen, Filipczak and Bis (1965) at the National Training School for Boys, Washington, D.C., have utilized what they refer to as operant conditioning to develop educational attainment in delinquent boys. In this project the boys were able to amass points by studying specific programmed instructional material (English 2600, Blumenthal, and some of the Temac courses). The points system allowed for the points to be saved until the conclusion of the units and the unit tests, and then converted into certain luxury items from the school canteen.

The research demonstrates that there were quite significant changes in reported behaviours and a substantial decrease in within institution problems. In this research it is possible that the results are confounded in that it is not demonstrable that similar improvements would not occur given the same reward system following conventional classroom practices. All that is substantially demonstrated is that programmed instruction may be easier to administer and is a method of individualised instruction for which it is easy to arrange for reinforcement contingencies. This particular research suffers the same deficiencies as the other researches cited, in that there were no pre-treatment and post-treatment measures of personality.

Personality Change

The major portion of the research in personality emphasizes the consistent, stable and immutable aspects of personality. In this research the theoretical stance is that a modification of behaviours may be brought about and particularly that personality may be modified.

It may be assumed that the personality and behaviours of prison inmates are by and large such as have brought them into conflict with society. Dollard and Miller (1950) have indicated that changes in behaviour are only likely when present behaviour causes difficulty. The milieu of a prison is not generally such that the behaviours which brought the inmate to the attention of the law are reinforced. The prison is deliberately designed to extinguish anti-legal acts, and, in fact, most prisons are relatively free of crime. It may follow, then, that if the inmate is in prison new behaviours may be reinforced and a change of personality may occur.

Unfortunately, many of the personality changes which do occur in a prison are for the worse rather than for the better.

As a general rule the prison inmate must comply with the regulations of the prison and it is therefore not difficult to have him embark on tasks which he would not ordinarily undertake. Rabbie, Brehm and Cohen (1959); Brehm and Cohen (1959) have asserted that the decision to engage in discrepant behaviour, i.e., behaviour which is not usual for the individual, is sufficient to arouse a dissonance and bring about an attitudinal change.

In summary the research seems to indicate that delinquents and criminals who have undergone training by programmed instruction and a system of rewards, both extrinsic and intrinsic, exhibit an improvement in behaviour. It also seems that the instruction does not, of necessity, have to be aimed at the personality directly. Rather it is suggested that instruction in purely academic subjects leads to an improvement in behaviour. It seems that such changes as have been observed may stem from cognitive processes. Almost all psycho therapy is aimed at the client's better understanding of his interior and exterior worlds. It may follow from this that an improvement in the cognitions of any variety may increase the scope of the subject and make him more able to understand himself and his surrounding world, and in that understanding be more capable of adjusting to that world in a manner which is socially desirable.

Chapter Three

In this chapter an attempt will be made to apply the conclusions taken from the related research to a theory of reformation and personality change through massed learning. This synthesis will lead directly to the statement of certain hypotheses to be tested.

Although there is a considerable amount of research which attempts to support the speculation that the criminal personality is predetermined and indeed is a correlate of either somatic structure or genetic make-up, such speculations do not appear to be supported by hard facts. If the foundations for such somatic and genetic speculations were solid then most of the efforts now being made towards reformation would be without virtue and a waste of both time and money. As it is, the consensus is that criminality is the result of damaged personality structures, such damage taking place in the formative years, but the damage is not conceived as being irremedial.

If the personality is not so badly damaged as to make any attempts to reshape it fruitless, and is, as has been suggested not predetermined, then it is possible that reshaping the personality can be brought about, for it would seem that the malformed personality is the result of learned patterns.

The review of the research indicates that the assessment of the

criminal personality is usually carried out using those instruments commonly used for the assessment of mental pathology. It seems as if the researchers are engaged in a search for a psychopathology of crime rather than for a series of response sets which are peculiar to criminals. Because of this bias it would appear that the measurements have led to descriptions of a number of surface traits which are shared by criminals and mentally sick individuals. This approach although it leads to a number of terms which may be applied to certain criminals so that loose descriptions may be used in research literature does not really differentiate the criminal from other groups. Indeed the literature is replete with terms such as passive-aggressive, sociopathic, asocial, and others but there is no clear cut description which appears to fit a large spectrum of criminals setting them apart from pathological groups or indeed from the so-called normal group.

If it is assumed that criminal activity although anti-social is not the result of a psychopathic condition but that any psychopathic responses are the result of criminal activity and faulty learning processes, then those responses should be amenable to assessment of a non-clinical nature. To elaborate on this and to clarify what is intended, it may be supposed that a youth who has been in conflict with the law, has suffered at the hands of the law and at the hands of those with whom he has been confined, may very well exhibit a feeling that he finds himself threatened. This need not be construed as paranoia or a tendency towards paranoia without further evidence. What the youth would be exhibiting is an acknowledgement of a true

state of affairs. He is threatened and his surroundings are threatening. To clarify this to an even greater extent; it may be presumed that a person confined in a concentration camp would feel threatened and most personality inventories or psychiatric assessments would reveal paranoid responses. The subject is not paranoid but is expressing a very real state of affairs. Kardiner and Ovesey (1966) have discussed this difficulty of assessment at length.

To minimize this difficulty of confusion of criminality with mental pathology it should be possible to assess the criminal in a manner which yields results in simple layman's terms removed from the terminology of psychopathology, and definitive of the criminal as a member of a specific group differentiated from other groups.

It is suggested that a relatively simple test as Cattell's Sixteen Personality Factors Test (16 PF) is a suitable instrument with which to assess personality. This instrument is easy to score, uses simple terminology for differentiation, calls for little if any interpretation by the administrator, and is fairly specific in the way it separates criminals as a group from other groups. It seems to be more suitable than the MMPI, the usual means of assessment, which may be particularly suitable for mental pathology, but may not be suitable when used with either normal or criminal personalities.

The Modification of Criminal Responses

It seems that many researchers operating in the field of modification of criminal personality feel obliged to refer to what they are doing as operant conditioning. This appears to be an example of

quite unnecessary mental acrobatics on the part of the researcher in that the only criterion, of the many criteria which are part of operant conditioning, used, is the following of a response by reward.

Common sense demands that we recognize that much personality change is entirely rational, as when a man decides to learn a particular social skill, or practices self control following a New Year Resolution. Some personality change is less conscious but just as deliberate as in learning from an admired model, each item of imitation being either self rewarding or externally rewarded. However, much behaviour is entirely random but certain items of random behaviour are rewarded consistently. It is this similarity of consistent rewards for a particular item of behaviour which has led to the confusion of 'law of effect' with the operant conditioning paradigm postulated by Skinner.

It would appear that much deviant behaviour is behaviour which falls under the heading of consistently rewarded random behaviour. Sir Cyril Burt (1925) has pointed out succinctly that the conscious statements of what the family of delinquents approve of may not coincide with what is unconsciously reinforced (to use the Skinnerian term) or rewarded. It is to be remembered that man unlike the maze animal of operant conditioning is not impelled to make approved responses through hunger, thirst, and other physical deprivations, but by the strength of tension or stress at the time of the response. The stresses in operation are often referred to as drives and in man there are many more drives than in maze animals.

If it can be shown that the criminal personality is similar to

the delinquent personality in that it shows defects in the same areas then we may be able to propose certain treatment methods to modify those traits. What appears to be of importance here is that before we commence treatment of any sort we must have a precise breakdown of the personality structure so that we may make propositions which are relevant. The structure of the criminal personality has been defined by Pierson, Cattell and Pierce, and if their findings are taken as accurate then it may be possible to propose a plan to modify those personality factors which are peculiar to criminals. It is not supposed that any treatment will be confined to a particular trait but will be generalized. It is this very generalization which has been noted by the researchers whose work was reviewed in Chapter Two. The method of personality modification may not be such that the criminal is merely taught to make conforming responses in the test situation but that he responds over a wide range in test situation and outside test situations.

If there is to be a modification of response then an understanding of the way in which the present responses came about may be of some considerable value. It is not possible to specify the exact series of steps which led to the distortion of a personality but it may be possible to make some general assumption for the criminal personality sui generis.

The paths of delinquency, normality and insanity may be conceived of as starting at the same origin, a stimulated drive. If the satisfaction of a drive is opposed there may be an amount of rage or aggression generated and that rage may either break the barrier setting up a pat-

tern of responding to barriers by aggression, the delinquent response. Or the rage may continue against the barrier and stay as anger, or it may be converted to phantasization which is the neurotic response. In the case of retention of anger, the normal response, a further splitting may occur, renunciation of the drive which is a normal response, a persistent aggression to the obstacle may generate which is the delinquent response, or a despairing appealing response which is neurotic may occur.

The normal renunciation of the drive may take the form of a decision to control the drive in the form of willed supression in accord with the categorical imperatives laid down by society. It may be sublimated or deflected and this is the pathway which both the delinquent and the highly competitive takes, or it may result in conflict and anxiety, the neurotic pathway.

This brief construction of the formation of the variety of personality may be diagrammed as in Diagram 1. Variations of the construction will occur for not all drives will be met by the same reactions.

Dominance

If the criminal is high on Dominance (Factor E) as is the delinquent it may not be assumed that the modification to be desired is the reverse of dominance. The research indicates that high E scores are found in people who excel in competitive activities. It must not be assumed that because the delinquent and criminal scores high on E that it is an undesirable trait. It may very well be that the delinquent with a low E score is more difficult to rehabilitate than is the dominant delinquent. In any case it may not be assumed that a purely educational act

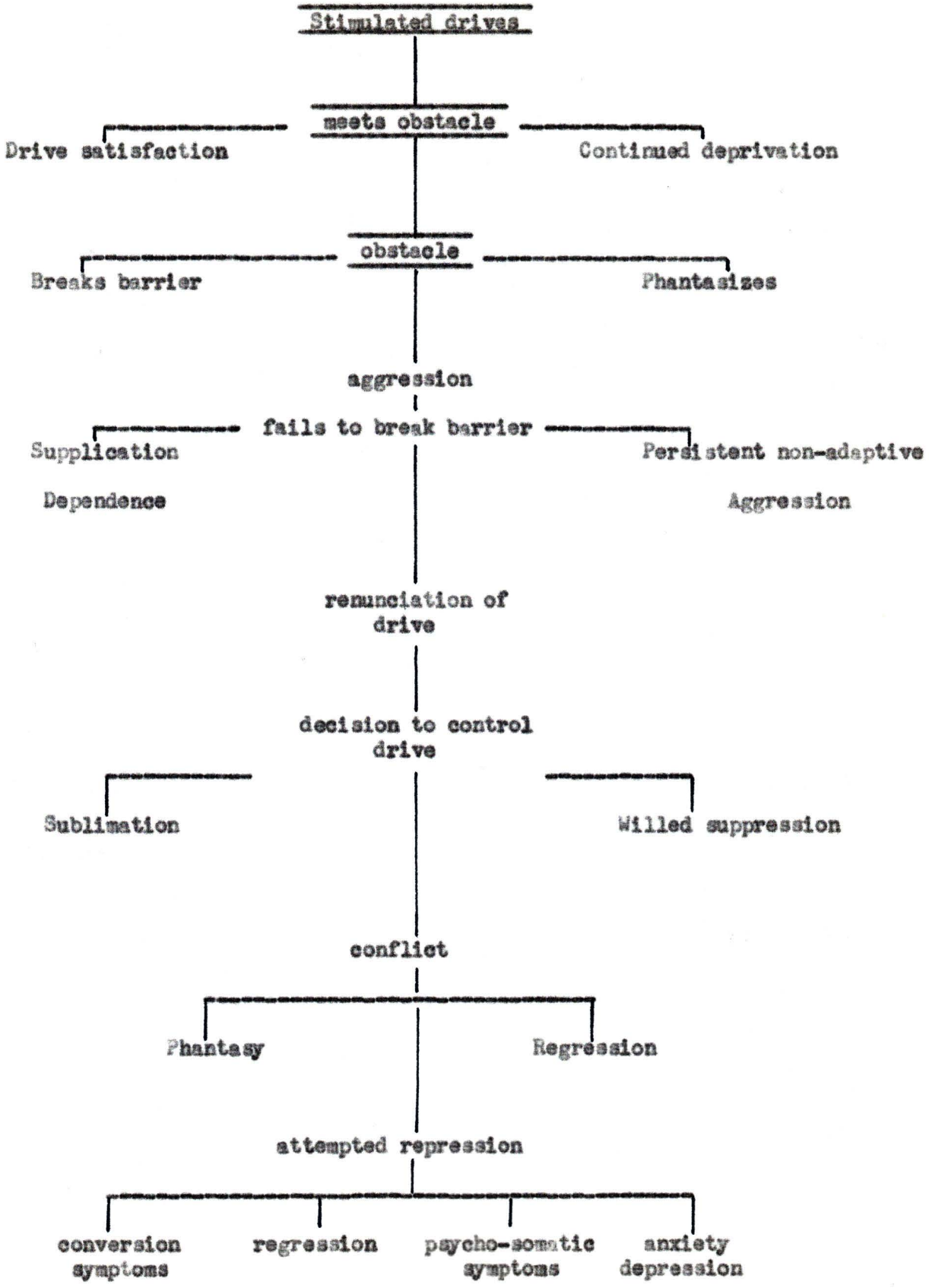

Diagram 1 (after Cattell)

will have any effect other than to increase the level of dominance in that giving the criminal a higher education may enhance his dominance rather than reduce it.

If education may be expected to increase a feeling of self worth and reduce the level of anxiety as will be suggested later then there seem to be no grounds on which to posit a reduction of the high E score.

One may speculate that the high level of dominance associated with delinquency is explicable in terms of the diagrammatic representation given (Diagram 1). Failure to break the barriers which prevent satisfaction of a drive is diagrammed as causing aggression one of the components of dominance. However, it is also observed that confidence is one of the components of dominance (16 PF data sheet, Appendix A). If the educative act reduces the level of aggression but at the same time builds up confidence it may very well be that the reduction of E score in terms of decreasing aggression may be fully compensated for by the increasing score brought about by increased confidence. In which case it would be expected that the E score would remain static.

Perseverance

Factor C which may be termed the perseverance factor or the super-ego strength factor, on which criminals and delinquents make particularly low scores would seem to be amenable to modification. The diagrammatic representation given (Diagram 1) would indicate that the pathways chosen are dependent to a large degree on this particular factor. It is observable that the component parts of the trait are expressible in terms of categorical imperatives and it is by and large in obedience to impera-

tives instilled in the early years of childhood that conforming responses are made.

However, by the time a delinquent becomes a criminal he is aware of the categorical imperatives of society and thus it is not germane to the matter to hold that the criminal is so because of a lack of categorical imperatives as may be the case with the juvenile delinquent.

It may be that the low score attained by the adult criminal is low because of his rejection of the imperatives and also because of his lack of perseverance. Common sense indicates that a person becomes persevering by carrying out ever-increasing periods of perseverance. If perseverance may be increased by schedules of reward following ever-increasing perseverance then this particular aspect of personality may perhaps be changed by programmed instruction.

In most programmed instruction the material is so arranged that the early frames are short and call for little perseverance, but each small amount of perseverance is followed by the reward of being correct. Perseverance is thus sustained and increased by steps or frames of increasing length, each step being rewarded by the knowledge of being correct.

It has been found by McKee (1966) that prison inmates accept programmed instruction readily, and persevere with that form of education to a greater extent than is the case with orthodox or traditional methods. This finding has been replicated by Cohen (1967), Brett (1967) and others.

It is suggested that exposure to programmed instruction will lead to an increase in perseverance due to the fact that it is somewhat of a

reinforcing novelty to the criminal to find that he is correct in his answers to problems of an academic nature. It is theorized that this reinforcement increases the perseverance level and in doing so changes the response set of the criminal to both hypothetical (testing) situations and to real life situations, such responses bringing about a change in the measured personality pattern. Such perseverance and such change in personality is not confined, as has been asserted before, but is generalized, and again this is part of the generalized improvement reported by the researchers.

Tender Mindedness

Factor I presents some considerable difficulties for a high score on this factor is not only the pattern of the criminal and delinquent but also the pattern of many if not most creative people. A high score is often termed femininity because females make very high scores on this factor, this is probably because of the high level of protection and indulgence that our society awards girls. The high level on I being termed tenderness is probably inappropriate, if by tenderness is intended affection, tender minded refers to an imaginative escapism rather than affection.

There do not appear to be any components of this factor that are amenable to modification by programmed instruction. Indeed it would be difficult to propose any short term therapy which would cause a modification of this factor. However, it may be that tender mindedness, although not correlated with any other single factor, may be dependent on a number of other factors and may modify as they modify.

Self Concept

One of the most significant traits in the personality of the delinquent and the criminal is that trait variously referred to as self-concept, self-esteem, or self-sentiment. Cattell's work indicates that the self-concept of the delinquent and of the criminal is of a very low order and is indicated by a low score on Q_3. It has been suggested by Snygg and Taylor (1952) that a poor self-concept is not only indicative of delinquency but is a reliable predictor of delinquency. It would seem theoretically feasible that an increase in score on Q_3, if a genuine indicator of enhancement of self-concept, should lead to a more stable relationship with society. It follows that if the personality may be modified and self-concept enhanced at the same time as perseverance level is being increased the subject of the manipulation should be approximating the behaviours of the general populace.

It is proposed that the self-concept may be ameliorated if the criminal can be made to have a better opinion of his education and his prospects for employment and can understand himself and others. It is presumed that the low self-concept is in great part derived from past failures and that the most consistent sense of failure occurred in the school setting as a child. It is true that there are criminals who had excellent school records as children, but the majority of such criminals also have excellent self-concepts, they are rarities and although criminals would not be so definable in terms of personality structure. The vast majority of criminals and delinquents have a history of school failures and early drop out from school.

Even if the reason for drop out was not academic failure the lack of formal education beyond the elementary level hinders the typical criminal in his search for honest employment. If he can be given a reasonable level of education in a short period of time two effects may occur: (1) If he can feel that he is better educated than the majority of the people with whom he has to compete, and if he is now in a position to present documentary evidence of secondary education he may feel more worthwhile, that is, have a better self-concept, and be more employable. (2) He will be able, because of his better education, to perceive more clearly what society is about and feel no longer apart from it and thus not in opposition to it in the form of commission of anti-social and extra-legal acts.

Guilt Proneness

Cattell (1963) has indicated that the criminal is high on factor O indicating a degree of apprehension and guilt. It is likely that if one consistently breaks the law and also has a history of being caught in illegal acts there would be some degree of apprehension and guilt. It is possible that a better understanding of language and an ability to understand and verbalize will lead to a reduction of apprenhension and guilt. It is fairly well known that one of the principle tasks of the psychotherapist is to have the client verbalize his problems in order that guilt and apprenhension which are frequently the basis of a problem may be assuaged. It may be that the act of psychotherapy is not very far removed from causing the client to be better acquainted with language by programmed instruction. If this is a fact then expo-

sure to language training by programmed instruction may cause the O level to reduce.

Emotionality

Cattell (1963) has also indicated that the criminal has a very poor control over his emotions (Factor C). He indicates that if a youth is delinquent despite good control over the emotions there is very little prospect of rehabilitation. Along with factor G this is one of the most certain indicators of criminality. It is invariably found in the common criminal, and good emotional control is only found in the case of those few criminals who have been successful but for the odd occasion on which they have been caught in an illegal act.

It is difficult however to mount any theory remotely connected with programmed instruction which would give the subject a greater control over his emotions. However, it may be that although factor C does not correlate with any other factor, according to Cattell, it may be dependent on a combination of factors and may change with a change in the factors on which it depends. It may also be that the small steps and the consistent reinforcement of programmed instruction may increase the level of tolerance to frustration.

Cognitive Style

Insofar as the cognitive style of criminals is concerned there is no research relating to cognitive style *per se* and criminal behaviour. However, if the work which has been carried out with delinquents is interpreted and related to the field of criminality some very interesting aspects are revealed and would lead to some theorization as to

the type of crimes and the type of criminal that would be associated with the differing cognitive styles.

If Will's (1964) research is interpreted and extrapolated to take in male criminals, and if Lemert's closure theory is also an aspect of cognitive style then it can be theorized that the true and persistent criminal, i.e., the confidence man, the embezzler, and the organizers of expert bank robberies will be of the analytic type, and highly creative. This type of criminal will not be characterized by a criminal profile, nor will he exhibit a history of failure. This is the exceptional criminal and such criminals make up a very small percentage of the prison population. So far there is no indication that these criminals and the so-called psychopaths are amenable to any change in either their personality patterns or in their anti-social behaviours. Such criminals will be inclined in this study but it is not expected that any change in their personality profiles will be exhibited.

On the other hand, the naive criminal, those who are involved in relatively crude crimes, the bogus cheque writer, the common thief, the one shot hold-up man, is probably classified as a global type. It is proposed that these criminals, and they constitute the majority, are salvable. It is expected that these criminals may be shown to be at the global extremity of the continuum global-articulate style, and as such they will but poorly perceive alternative methods of solving problems other than the most blunt and often criminal methods.

If cognitive style is a personality variable and if subjects on the continuum global-analytic tend to perceive phenomena in the manners

which have been suggested, then a change in personality factors may also change the position of the subject on the global-analytic continuum. It may also be proposed that the presentation of subject material in orderly analytic sequence as in linear type programmed instruction may train the global subject to be more analytic and thus bring about a measurable change of cognitive style.

Personality Change and Therapeutic Methods

It is quite probable that the criminal is a product of the learning situations to which he has been exposed, and it follows that the learning situations may be extended. Most acceptable behaviours are compounded of behaviours common to society and instilled initially by the family and later by the school systems. The behaviours and values cherished by society are codified, exemplified and carried partially by the materials presented to the students in school. Literature, history and indeed almost all the subject matter presented in the schools serve as vehicles for the value systems of the surrounding culture. It is for this reason that society as a whole is concerned when material which runs counter to the cultural and value system in operation at the time, is presented in schools.

If, as has been stated, the criminal was a school drop out then he will have missed part of the presentation of values, and thus it is not solely a matter of his rejection of the value system but rather his slighter knowledge of the value system which leads to his criminal behaviour. Then it should be possible to retrace the missing steps and take the criminal through those steps which he missed by being a drop out and

bring about some modification of his behaviours.

If the phenomenologists are correct in the assumption that man is the result of all the intra-personal and extra-personal forces which make up his world and his perception and interpretation of those forces, then if either the phenomena, the perception of the phenomena, or the interpretation of the phenomena, are changed the result is a changed person. It is suggested that programmed instruction modifies one or more of these facets in that any massed learning situation will result in a sharpened perception of phenomena, greater ability to verbalize phenomena, and thus understand the phenomena more fully, or a greater ability to interpret phenomena and thus render them understandable.

To render this in a simple manner we may analogize man in the civilized world to the naive savage with his fear of natural phenomena. Once the natural phenomena have been explained and the rules which order the phenomena understood, superstition and fear are replaced by understanding and ease in the presence of that phenomena.

The understanding and interpretation of the phenomenological field forms the basis of many systems of psycho-therapy particularly Rogerian or Client Centred Therapy which is posited on the restatement of the phenomenological field to the client in therapy, or rather the process of leading the client to express and re-interpret his field.

The proposition that programmed instruction is therapeutic is explicable in terms of Kelly's (1955) theory of constructive alternativism. An ability to manipulate language and mathematics may allow the subject to give wider meaning to his field, or allow him to differentiate between

various aspects of the field. Thus the presentation of material which is easily assimilated may very well act as a therapeutic agent, in that it enables the subject to construct more alternatives to follow because of his increased capacity to reason.

As was stated in the introduction to this study the purpose is to clarify the value of correctional education in penitentiaries, and to demonstrate that value if possible. It may very well be that there are any number of ways to evaluate penitentiary education, in terms of post release employment, psychiatric assessment, length of time out of prison without further imprisonment, and no doubt many others. However, each of these methods of evaluation have obvious disadvantages; post release employment is no proof of non-criminal activity; psychiatric assessment is a subjective matter, frequently inaccurate; length of time out of prison with no criminal activity is no doubt the soundest criterion of all, but can hardly be taken up as a short term research project.

It may very well be that personality assessment, even when that assessment is made as objective as possible, is an area of considerable difficulty, but an attempt has been made to avoid areas which are open to a great deal of dispute, and to render the facets of personality examined as neatly as possible.

Postulates

Although the purpose of this study was to evaluate correctional education *per se*, it appears that the direction has been to consider programmed instruction as a reformative agent. This aspect has been

given predominance because the experimental group was exposed to this form of massed learning; on the other hand traditional methods are also examined in that one control group consists of a class of inmates exposed to massed learning by traditional methods. In addition to the examination of the modification of personality factors, attention has also been given to cognitive style and its relationship to criminality. In general, however, the emphasis is quite definitely posited on the idea that academic education itself is a reformative act with the corollary that academic education in the prison is best carried out by means of programmed instruction. From these basic ideas the following postulates may be derived:

Personality

Personality is the complex of psychological structures which delineate man. It seems that in the case of the criminal those delineating structures are of a specific type; and it seems that the criminal may be identified by responses typically of his personality and atypical of the normal and neurotic responses. The personality of the criminal is such that his behaviours are more likely to bring him to the attention of the police than the possessor of a non-criminal personality. It appears from the various schools of psychotherapy that personality is a modifiable variable and that modifications occur both spontaneously and by manipulation. If that is so then there is reason to assume that the criminal personality may also be modified.

Cognitive Style

Cognitive style may be associated with the scheme of perception and may be the same construct as referred to as coping style or percep-

tual style. It may be postulated that the method of accommodating to stress situations may vary in accordance with the cognitive style of the subject. It would be a mistake to infer that either of the two extremes of cognitive style implies better adaptation to life situations or pathology, for such evidence is not found in any research. However, it may be that the person at the global extreme of the continuum tends to solve stressful situations by immediate and direct action according to the strength of the surrounding phenomena as perceived. On the other hand the subject at the analytic end of the continuum may only act and react to the phenomena after a period of analysis of the stressful situation. It is postulated that the analytic person because of his analysis of situations is less likely to be in a position wherein he is in conflict with the law, whereas the subject who is at the global end of the continuum is more likely to make hasty and premature decisions which may bring him into conflict with the law. If this is so then it is likely that the criminal will be most commonly a global type, and the analytic type criminals will probably be those involved in the more sophisticated crimes. It is suggested that cognitive style may be measured by the Hidden Figures Test, which will be discussed at a later point in the study.

Programmed Instruction

The research suggests that programmed instruction is an efficient method of presenting a massed learning situation. It is postulated that an increase in knowledge, and success in the learning situation is associated with generalized behavioural improvements. It is suggested that an increase in academic status will improve the self-concept and that ex-

posure to the values implicit in academic subjects will broaden the concept of social values and thus increase the amount of super-ego strength as measured on Factor G scale of the 16 PF. Further, ability to verbalize and express may decrease the amount of guilt and anxiety. The generalized improvements which are postulated should be measurable if they occur. If these changes take place after exposure to massed learning situations then the greater the extent of the massed learning situation the greater the magnitude of personality change. If the improvements are in fact generalized then all factors of personality should change but those patterns which deviate from the normal should change by the greatest amount if the changes are towards the normal and acceptable.

Specific Hypotheses

I. If the personality of the criminal is of a specific pattern, and if the inmates of the penal establishments used in this study are truly criminals, then the personalities of the subjects used in this study will be found to be of that specific criminal type. Specifically the mean scores of the groups will show characteristic deviations from the mean on Cattell's 16 PF on Factors C, I, G, E, O, Q_3 and Q_4 if the assumptions specified are in fact true.

II. If the majority of criminals are naive criminals and the subjects of this study are representative of the majority of criminals, then an analysis of the cognitive style of the sample of inmates will reveal that they are of the global type.

III. If cognitive style is mutable, by means of massed learning, towards the analytic end of the continuum, then after the experi-

mental exposure to massed learning there should be a shift in the mean score obtained in a test of cognitive style towards the analytic end of the continuum.

IV. If programmed instruction is more efficient in terms of speed of learning, and if learning brings about a change in personality and a generalized improvement in behaviours, then the group exposed to massed learning by programmed instruction should show a greater change on Factors C, I, G, E, O, Q_3 and Q_4 than the groups not so exposed.

Chapter Four

Chapter Three dealt with the delineation of a theoretical framework by which the related research and theory were brought together in a synthesis which led to the setting out of a series of hypotheses. This chapter will describe the experimental and the control groups and the settings in which the groups were located. The various training programmes within which the experimental group and the control groups were placed will be given, and the method of assessment of personality change will be described.

The Groups

The experimental group consisted of eighteen inmates of the William Head Minimum Security Institution, a unit of the Canadian Penitentiary Service. William Head is a rather pleasant headland some seventeen miles west of Victoria, British Columbia. The institutional buildings are quite new and well appointed. Total inmate population varies between 135 - 150 men of between the ages of 19 and 45, with a mean age of 26.

The experimental group, Group I, was kept at a constant total of 18 by taking a total of twenty-three inmates in school at the beginning of the experiment and using eighteen cases at random, and as

drop-out by parole or return to parent institution occurred, replacement by randomly picking from the five extra cases.

Group I does not represent a random sample of the inmates within the institution no more than does any class of adult students represent a cross-section of any population other than the population of adults in education. It is in fact a complete selection of those inmates within a prison who choose, or are willing, to attend penitentiary academic school.

It was not found possible to enrol a random sample in the experimental group for a number of reasons. Many of the inmates of penitentiaries do not wish to attend school, and it is not possible, within the setting, to coerce them into doing so, nor is coercion desirable. Furthermore, a random selection may not be attained, for it would be immoral to refuse to admit an inmate to school, who desired and needed education, merely because such an admittance would interfere with a random selection.

Group II (N=18) was drawn from the same setting as the experimental group, William Head, and is of similar structure insofar as length of sentence, crimes committed and mean age is concerned. This group was randomly drawn from a total of 64 inmates not attending school, each of whom wrote 16 PF Questionnaires in a routine manner.

The mean scores for this group of 64 William Head inmates is given in Table 2 (Appendix C).

As will be observed later, the pre-test scores for the William Head groups are close to the means given in Table 2.

A summary of the two groups is given in Table 36, Appendix C.

The Matsqui Groups

Groups III and IV were located in the Matsqui Institution. The Matsqui Institution is a drug addict institution, wherein are imprisoned those criminals who are drug addicts as well as being criminals.

The Matsqui Institution is the newest unit of the Canadian Penitentiary Service in British Columbia, the buildings and treatment centres being less than three years old at the time of this experiment. It is well staffed and a good deal of group and individual counselling and psychotherapy is carried out, much more so than is the case at the William Head Institution. In addition to the newness of the plant, both the Warden and the Superintendent are particularly well informed and enlightened, and both are keenly interested in the welfare and rehabilitation of their charges. The academic staff is larger than at William Head and is, in fact, more able to function autonomously than is the academic school at William Head. However, the population of inmates are more seriously in trouble because of their drug addiction problem than are the inmates at William Head.

The two groups at Matsqui were chosen in much the same manner as the groups at William Head. Group III, Matsqui school attenders, consists of those people who chose to attend school to take an upgrading course to the Grade Ten Equivalency level. The method of teaching within Matsqui may be properly termed traditional and orthodox as differentiated from the teaching method at William Head which is non-traditional and unorthodox.

Group IV, Matsqui, non-school attenders, consists of a group of inmates randomly selected from the population not involved in academic upgrading. This group partook in the standard psychotherapeutic groups as did also the inmates attending school.

The experiment was conducted during the months of April, May and June of 1969, the duration of the experiment being 90 - 95 days for each participating inmate.

Attrition in the Matsqui Groups

For administrative and practical reasons it was not possible for the experimenter to have any control on the final size of the two control groups at Matsqui. Both groups commenced with 21 in each, but by the end of the experiment Group III had dropped to 14 and Group IV to 15.

Instruction of Group I

The participants in the experimental group were involved in a massed learning upgrading programme, which is the customary method of academic improvement at the William Head Institution. The sequence of programmed texts used were all those texts used in the programme at the Institution in what is known as the Metchosin Plan for Upgrading, Steps 1 and 2.

The Metchosin Plan consists of upgrading through series of programmed texts, the individual student choosing the point at which he will commence. That is to say that no curriculum or rigid sequence of texts is prescribed. It is required of the students that they present themselves, when ready, for either a Grade Ten Equivalency examination or Departmental Examination at Grade XIII level for the Province of British Columbia.

A complete list of the programmed texts and the system used is giv-

en in Appendix B.

Work Tasks of Group II

There is no plan for group or individual psychotherapy at the William Head Institution, nor does there appear to be any consistent and visible plan for the rehabilitation of the total inmate population.

The random sample of inmates from the non-school population includes some inmates who were involved in a vocational electrical course, some from a vocational carpenters course, some from a vocational masons course, but the majority are from areas of the camp wherein no aspect of training predominates. At the time of the experiment fewer than one third of the inmates were in training, or at least in training which would be so labelled by those who understand what the concept of training involves.

Group III Matsqui

This group was involved in academic training to attain that standard referred to by the Canada Manpower Commission as Basic Training for Skill Development. This programme consists of upgrading in English, Mathematics and Basic Science to an approximate Grade Ten level. The method of academic teaching at the Matsqui Institution is by traditional classroom instruction.

Group IV

This group was involved in the general duties of the Matsqui Institution and took part in the general therapeutic and counselling sessions offered by the institution.

Reinforcement with Group I

In the case of Group I a high output was attained, and the teacher,

being freed of the lecture type tasks which are taken care of by the programmed material, was able to offer frequent verbal reinforcement for completion of large amounts of work output. Additionally because the inmates were able to produce a large amount of work it was possible to allow longer coffee breaks and time out. Even though the inmates were in school for seven and a half hours per day for five days per week boredom did not appear to set in. The easiness which is generated in a programmed instruction class appears to generate a greater interest in learning tasks and to reduce the number of discipline problems. It would perhaps be worth indicating at this point that during the five years which programmed instruction has been in use in this setting there has been no occasion on which the teacher has had to charge an inmate for a disciplinary offence.

It would appear that programmed instruction gives the inmate confidence in his ability in the subject areas which he has studied, and it is common, in the setting, for an inmate who has completed a programmed course to voluntarily aid other inmates who are in the process of going through the program.

The Mechanics of the Experiment

The inmates involved in the experiment were all exposed to the administration of a 16 PF Questionnaire, Form B, and the Hidden Figures Test before entry to the group. After a period of 90 to 95 days each member of the groups wrote the same tests again.

It was presumed that there would not be any contamination of the second test by memory of the first to such a degree as to render the results unreliable. The administration of parallel forms was considered but was dismissed because it would have been awkward to obtain permission

for the introduction of yet another set of tests into a setting over which the experimenter had no control. Furthermore it was considered that the stability of the test over the ninety day period would be sufficient.

In the case of the Hidden Figures Test there was a possibility that the hidden figures would be remembered over the interim period between pre-testing and post-testing. However, it was not possible to avoid this contingency for there is no parallel test form for this instrument. As the purpose of the experiment was to measure change in the groups and as it can be presumed that the conditions of memorization are the same for all groups, it was considered that any instability caused by readministration of the same test could be dismissed or accounted for by the difference in magnitudes of change.

The Test Instruments

Cattell claims that the 16 PF Questionnaire measures sixteen functionally independent and psychologically meaningful dimensions of personality. Ten to thirteen questions are provided for each factor. The usual practice for diagnostic purposes is to administer both forms of the test and then sum the results of both. However, this practice is only usual when individual scores are required. When group scores are required the practice is to administer one form of the test only.

Form B of the questionnaire which was used in this study has a quite reasonable re-test reliability coefficients which are given in Table 3 (Appendix C). Although the test re-test reliabilities appear low, considering that the period of time is but six days between the tests, in comparison to achievement tests, a comparison between this test and many

other personality inventories indicates that the reported reliabilities are quite reasonable, especially for groups.

The Hidden Figures Test is a thirty minute timed test which assays the ability to perceive a geometric figure which is embedded in a matrix of straight lines. Research by Witkin et al (1949), Gardner (1953) and Jackson, Merrick and Myers (1964) has shown that such tests correlate highly with the Rod and Frame Test and other measurements of cognitive style, e.g., paired associate tasks (Kagen et al., 1963), memory tasks (Gardner and Long, 1961), concept identification (Baggeley, 1955).

It is usual to consider that any raw score above 24 on the Hidden Figures Test indicates that the respondent is analytic and that any raw score below 14 is indicative that the respondent is global. Scores between those two points are considered to be within one standard deviation above and below the mean.

Chapter Five

To determine whether or not academic education, in general, and programmed instruction in particular has any effect on personality, the means and standard deviations of the pre-test and post-test scores attained on the 16 PF and the Hidden Figures Test were computed.

Table 4 (Appendix C) shows the means and standard deviations for the pre-test on the 16 PF. It may be observed that in the case of Factor A the experimental group is a little lower than the other groups and that Group III is more than 1 sten score above the mean (5.5 for population in general). This would seem to indicate that if there is any difference at all it would be expected that the members of Group III are inclined to be more schizoid than the members of the other groups.

It may be observed that all the means on Factor C are lower than the general population mean, as would be expected in a prison population. Groups II, III and IV are at least one full sten lower than the mean and Group I approaches very closely to one full sten below the population mean.

Factor F is not generally considered to be of significance in criminality and delinquency, but as can be seen the means for all groups are higher than the population mean. This factor is nominated by Cattell (1956) as Surgency, and the high scorer is impulsive, lively, gay and en-

thusiastic. Perhaps this accounts for the fact that prisoners as a general rule are not typified by sobriety, prudence or taciturnity, which is the low scorer characteristic, Desurgency.

Factor G, is low, as would be expected, but unexpectedly the mean for Group II is only slightly less than one full sten below the mean whilst the other groups are at least two full stens below the mean.

Factor M is of interest in that it is not generally considered to be important in the criminal personality although it is characteristically high in prison population. This factor is termed Autia, and is seen in its highest score form in neurotics and immature personalities.

Factor O, as would be expected, is higher than the mean, but there does not seem to be any greater amount of apprehension in the two drug addict populations than in the non-addict population, which is rather surprising. One would have expected that the addicts would have had more guilt and anxiety than would the general run of criminals.

Most studies report a low self concept, Q_3 for criminal and delinquent populations, such does not appear to be the case for these groups. None of the means for the groups attains a level below one sten less than the mean for the general population.

Factor Q_4 is surprising in that it shows that Group I appears to be different from the other three groups insofar as level of ergic tension and level of sense of frustration is concerned. It is observable that Group I is at the mean for the general population whilst Groups II, III and IV are higher, two of them, Groups III and IV, being at least one full sten above the general population mean. It is interesting to

note that on this factor the drug addicts have a higher score than the non-addict criminals.

The differences in means for the groups did not attain significance in any case.

As previously stated the Hidden Figures Test was also given during the pre-treatment period. The means and standard deviations of the resultant raw scores are given in Table 5, and will be discussed later.

Table 5

Hidden Figures Test Means and Standard Deviations

Group	Mean	Standard Deviation
Group I	14.60	8.16
Group II	11.70	7.97
Group III	7.57	6.49
Group IV	9.10	7.54

Between Groups Comparisons

Two significant problems emerge from a consideration of the pre-treatment means obtained and the method of obtaining the means. The first problem which emerges is the fact that the groups are not truly random samples from the population of penitentiary inmates, and the second problem is that the means of the groups are not nearly the same for some factors. If a change in personality and cognitive style is to be attributed to educational advantage then it must be shown clearly that such a change is attributable within limits of error to educational treatment and to no other variable. It must be demonstrated that the changes which occur if any are not dependent on differences which already existed before the

treatment began.

Winer (1954, p. 578) suggests that such a control may be exerted by a statistical method as well as by an experimental method. He suggests that the analysis of covariance of the data will resolve within the limitation of error whether any change is the result of treatment rather than pre-existing qualities.

In this study, then, it was considered that if the pre-treatment scores were used as the concomitant variable and their influence removed by linear regression methods the residual sums of squares could be used to provide variance estimates which could be used to make tests of significance, (Ferguson, 1959, p. 327). It was considered, further, that in cases where a significant F ratio was obtained then a t-test for differences among means, after Dunnett's (1955) model, would clarify which of the four groups differed from the others.

Although the purpose of the study was to discover whether education affected the various factors which are specific to criminality and delinquency, not only those factors were dealt with. All of the sixteen factors were submitted to an analysis of covariance. It was felt that such a procedure would allow for a more meaningful discussion of the changes which might occur. It was assumed that the personality factors other than the specific for criminality would be normal. Now, if a variation can be made to occur within the criminal specific factors alone then the factors which are not specific to criminality should remain static or more or less so. If on the other hand changes in the criminality factors varied and at the same time factors not specific to criminality also varied there would be reason to suspect that the modifications occur-

ring were open to suspicion. In fact the non-criminal specific factors serve as an additional control in the experiment.

The analysis of covariance of Factor A is given in Table 6. It may be observed that in no case does the change in means for pre and post testing amount to one full sten score. The F ratio amounts to .53 indicating that no changes of any significance occur for any group.

Table 6
Analysis of Covariance - Factor A

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	5.27	6.00	6.16	5.83	6.92	6.71	5.86	6.26
S.D.	2.67	2.71	2.04	2.15	1.62	1.32	2.18	1.76
Adj $\bar{X}$	6.28		5.77		6.36		6.32	

Source of variation

	Between	Within	Total
Sum of squares pre-test	22.21	284.77	306.98
Sum of squares post-test	68.48	190.29	197.13
Degrees of freedom	3	61	64
Adjusted mean squares	1.30	2.47	63
Degrees of freedom	3	60	63
Adjusted F	.526 non significant		

Table 7
Analysis of Covariance Factor B

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	7.66	8.00	7.33	7.05	6.78	6.78	6.79	7.19
S.D.	1.61	1.94	2.06	1.95	2.06	1.89	1.97	1.47
Adj $\bar{X}$	7.72		6.97		7.00		7.41	

Source of variation

	Between	Within	Total
Sum of squares pre-test	9.027	214.75	223.79
Sum of squares post-test	13.744	203.70	217.44
Degrees of freedom	3	61	64
Adjusted mean squares	2.1885	2.265	
Degrees of freedom	3	60	63
Adjusted F	.965 non significant		

Factor B (Table 7) serves as something of a quality control in that it was not expected that the measured intelligence should vary for the groups in such a short period as ninety days. It can be seen that in fact the means for the groups are fairly consistent, the maximum mean change recorded being only .40 of a sten.

Factor C, a factor specific to criminality and delinquency (Table 8) was affected by the treatment programme. It is observable that for Group I there was a mean increase of 1.45 stens towards higher ego strength and away from lower ego strength which is a change in the desired direction. In the case of Groups II, III and IV changes were non significant. Table 9 (Appendix C), the table of t-tests for differences among means shows that there is a significant difference for Group I compared to each of the other groups. There is no indication of significance for any other pair.

Table 8
Analysis of Covariance - Factor C

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	4.66	6.11	4.27	4.44	4.00	3.64	3.73	3.59
S.D.	1.96	1.65	1.63	1.73	1.52	1.73	2.21	2.11
Adj $\bar{X}$	5.91		4.41		3.72		3.79	

Source of variation	Between	Within	Total
Sum of squares pre-test	7.855	204.544	212.400
Sum of squares post-test	69.117	203.036	272.154
Degrees of freedom	3	61	64
Adjusted mean squares	16.684	2.769	
Degrees of freedom	3	60	63
Adjusted F	6.02	p < .002	

Although Factor E (Table 10) is significantly high in juvenile delinquents it is not considered to be a significant factor in criminality. How-

ever it may be observed from Table 10 that there is a tendency for Group I and the Matsqui groups (Groups III and IV) to be higher than the mean on this factor. However, the increase in the factor does not analyze out to be significant. The evidence appears to be that if there is any trend at all on Factor E it is towards more aggression rather than less, and the indication would be that the prison setting is generally of such a nature as to increase the level of assertiveness, aggression, and independence rather than towards conformity and mildness.

Table 10
Analysis of Covariance - Factor E

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	5.83	6.94	5.27	6.11	7.28	7.50	6.59	6.46
S.D.	1.46	1.55	2.37	2.47	1.69	2.38	1.81	2.24
Adj $\bar{X}$	7.11		6.55		6.94		6.25	

Source of variation	Between	Within	Total
Sum of squares pre-test	36.570	218.568	255.138
Sum of squares post-test	17.059	287.955	305.015
Degrees of freedom	3	61	64
Adjusted mean squares	2.411	3.891	
Degrees of freedom	3	60	63
Adjusted F	.619 non significant		

Factor F, again, is not regarded as specifically important in criminality but again the means for the groups are higher than the population mean (general population). Although there is a difference between pre-test and post-test means, that difference does not reach significance for any group. The data for Factor F is given in Table 11.

Table 11
Analysis of Covariance - Factor F

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	6.44	7.16	6.38	6.72	6.71	6.14	5.53	6.13
S.D.	2.02	2.05	1.93	2.29	2.53	2.43	2.17	1.58
Adj $\bar{X}$	7.05		6.64		5.85		6.61	

Source of variation	Between	Within	Total
Sum of squares pre-test	11.702	297.312	309.015
Sum of squares post-test	12.222	295.559	307.784
Degrees of freedom	3	61	64
Adjusted mean squares	3.821	2.835	
Degrees of freedom	3	60	63
Adjusted F	.134 non significant		

Factor G, Table 12, is of significance in both juvenile delinquency and criminality. As may be observed, the means of the groups demonstrate that this is true in these cases, especially for Group I and the two Matsqui groups which have mean scores on this factor two full stens below the general population mean. It is of some interest to notice that the mean score of Group I significantly increases by 1.5 stens, the desired result, during the treatment period. It is also of interest to note that in the case of the non school group at William Head there is a decrease of over one full sten. The two Matsqui groups show a non significant increase in mean score.

Table 12
Analysis of Covariance - Factor G

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	3.50	5.00	5.00	3.55	3.50	3.92	3.46	3.79
S.D.	1.86	1.80	2.36	1.92	1.99	1.86	1.65	1.70
Adj $\bar{X}$	5.15		3.13		4.08		3.97	

Source of variation	Between	Within	Total
Sum of squares pre-test	29.712	193.733	223.446
Sum of squares post-test	21.672	207.773	229.446
Degrees of freedom	3	61	64
Adjusted mean squares	11.406	2.980	
Degrees of freedom	3	60	63
Adjusted F	3.82	p $<$ .02	

On the basis of this factor alone it may be speculated that a minimum security institution in which there is no set policy of rehabilitation, either through educative acts or through psycho-therapy, is of doubtful value insofar as the modification of ego-strength in a positive direction is concerned.

Table 13 (Appendix C) shows that the mean of Group I was significantly different to all the other group means but that there was no significant difference between any other pair.

Factor H (Table 14) is rather surprising in that this factor, Threctia (low score) and Parmia (high score) is not rated as being specific for any clinical group (see Appendix A). Furthermore the low scores which are indicative of shyness, timidity, diffidence and restraint are not the characteristics which one would expect to find in the prison setting. However, as may be observed, Group I improved towards the mean on this factor (significant at .05 level). Table 15 (Appendix C) demonstrates that the change in means was significant when Group I was compared with Group II but that there was no significance when any other two groups were compared.

Table 14
Analysis of Covariance - Factor H

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	4.44	5.66	4.55	4.33	4.50	4.71	3.86	4.73
S.D.	2.26	2.03	2.12	2.22	2.14	1.33	2.07	2.02
Adj $\bar{X}$	5.61		4.20		4.62		5.03	

Source of variation	Between	Within	Total
Sum of squares pre-test	4.739	284.122	288.861
Sum of squares post-test	17.225	223.790	251.015
Degrees of freedom	3	61	64
Adjusted mean squares	6.317	2.104	
Degrees of freedom	3	60	63
Adjusted F	3.002	$p < .05$	

Factor I (Table 16) is held by Cattell (1952) to be specific for both delinquents and criminals but such an assertion is not borne out by the data collected at William Head and Matsqui. It can be seen that the mean scores for all groups fall within the range of ½ sten score of the general population mean. In such a case any change that occurs should be in the direction away from the specific to criminality score. The specific criminality score is towards the high score end of the scale, tender-mindedness. The greatest change occurring on this factor was with Group I, the mean of which declined 1.50 stens. All other groups showed a decline, the desired outcome, but not of such a great proportion. In no case was the change of such magnitude as to reach a significant level.

Table 16
Analysis of Covariance - Factor I

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	5.77	4.27	5.50	5.11	5.35	4.85	5.00	4.86
S.D.	1.83	1.74	2.12	2.15	1.78	2.00	1.46	1.79
Adj $\bar{X}$	4.14		5.08		4.88		5.02	

Source of variation	Between	Within	Total
Sum of squares pre-test	5.112	204.825	209.938
Sum of squares post-test	6.701	250.836	257.538
Degrees of freedom	3	61	64
Adjusted mean squares	3.253	3.712	
Degrees of freedom	3	60	63
Adjusted F	.876 non significant		

Factor L (Table 17) is not held to be specific for criminals or delinquents although an examination of Cattell's data (Appendix A) shows that the scores on this factor for criminals, delinquents, addicts and the mentally sick, are higher than 5.5, the general population mean. Al-

though the change does not reach significance it is of interest to observe that in two cases, Group I and Group IV there is a decrease as is desirable, whilst in the other two groups there is an increase. At a later point it will be mentioned that there are other differences which are shared to some degree by these same two groups.

Factor L, low score (Alaxia) denotes a trusting, adaptable, easy to get along with person, whilst a high score (Protension) denotes a suspicious, self opinionated person. It is surprising that this factor does not rank as being more specific to criminality than is the case, for common sense would seem to indicate that the description of protension is an apt description of what a criminal is generally considered to be.

Table 17
Analysis of Covariance - Factor L

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	6.22	5.88	6.11	6.44	5.87	6.85	6.33	5.66
S.D.	1.77	2.37	1.91	2.01	2.07	1.87	1.53	2.75
Adj X	5.84		6.45		7.01		5.55	

Source of variation	Between	Within	Total
Sum of squares pre-test	1.816	269.937	271.753
Sum of squares post-test	13.129	313.270	326.400
Degrees of freedom	3	61	64
Adjusted mean squares	6.262	3.851	
Degrees of freedom	3	60	63
Adjusted F	1.626 non significant		

Factor M (Table 18), low score, praxernia, is indicative of a careful, conventional personality, whilst the high score, autia, is indicative of the imaginative, Bohemian type, is not reported by Cattell (1952-1968) as being specific to criminality. However, like Factor L, Factor M is found to be high for almost all the clinical profiles given by Cattell

(Appendix A). This high score is borne out by the means for all of the groups taking part in the study. The only group which is near the general population mean is Group II. Changes in this factor do not appear to have occurred, the maximum difference between pre-test mean and post-test mean amounting to only .62 of a sten which could have occurred by chance. One questions whether autia is altogether a bad characteristic when it is perceivable that many respected professions have high mean scores on this particular factor (Appendix A). It is assumed that further education would not have the effect of decreasing the amount of imagination or bohemianism which appears to be more pronounced as the higher rungs of the educational ladder are climbed.

Table 18
Analysis of Covariance - Factor M

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	6.88	7.50	5.66	5.77	6.85	6.42	6.33	6.19
S.D.	1.91	1.53	1.49	2.66	2.00	2.03	2.67	1.94
Adj X	7.26		6.14		6.21		6.23	

Source of variation	Between	Within	Total
Sum of squares pre-test	16.958	210.825	227.784
Sum of squares post-test	28.806	267.440	296.246
Degrees of freedom	3	61	64
Adjusted mean squares	4.899	3.626	
Degrees of freedom	3	60	63
Adjusted F	.1350 non significant		

Factor N (Table 19), is not regarded as specific for criminality, and as can be observed, the means bear out that there is no vast departure from the general population mean except in the case of Group II. On examination the scores on the pre-test and post-test for all groups show marked instability, and an examination of the reliability co-efficient data

given in Table II substantiates that this factor has the lowest reliability of all.

Table 19
Analysis of Covariance - Factor N

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	5.11	5.22	3.77	5.05	5.35	5.85	5.59	5.59
S.D.	2.25	2.31	1.45	2.18	1.84	1.88	1.84	2.00
Adj $\bar{X}$	5.15		5.39		5.72		5.39	

Source of Variation	Between	Within	Total
Sum of squares pre-test	36.042	222.203	258.246
Sum of squares post-test	6.229	301.370	307.600
Degree of freedom	3	61	64
Adjusted mean squares	0.833	4.714	
Degrees of freedom	3	60	63
Adjusted F	.1767 non significant		

Factor O (Table 20) is regarded as specific and significant in the criminal profile, and this is borne out by the data collected. In only one case, that of Group IV, is the mean score less than 1.5 stens above the general population mean. The tendency towards guilt, apprehension,

Table 20
Analysis of Covariance - Factor O

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	6.83	4.55	7.11	6.72	7.28	6.21	6.06	5.73
S.D.	2.01	2.20	2.03	1.67	1.64	1.44	2.46	2.02
Adj $\bar{X}$	4.55		6.61		6.03		6.02	

Source of variation	Between	Within	Total
Sum of squares pre-test	13.070	254.068	267.138
Sum of squares post-test	45.63	215.346	260.984
Degrees of freedom	3	61	64
Adjusted mean squares	13.79	2.963	
Degrees of freedom	3	60	
Adjusted F	4.654	$p < .01$	

and depression is marked for every group except the one, but all groups show a decrease in the mean score on the post-test. A decrease in score is desirable on this factor, and it may be seen that in the case of Group I the mean decrease amounted to 2.39 stens. This decrease, which is not nearly met by any other group is significant at the .005 level. It is a decrease which cannot be accounted for by sampling variability. Table 21 (Appendix C) indicates that the decrease is significant when the mean decrease is compared to the mean decrease of any other group. The decreases which occurred in Groups II, III and IV are not significant when they are compared with each other.

In the case of Factor Q_1 (Table 22), conservatism, at the low score pole and radicalism, at the high score pole, it can be seen that the means are not far from the population means and any variation about that is not of sufficient magnitude to be discussible as a real variation which could not be accounted for by sampling variability.

Table 22
Analysis of Covariance - Factor Q_1

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	5.88	6.50	4.77	5.44	5.42	5.85	5.19	5.66
S.D.	1.82	1.86	2.03	1.92	1.65	2.31	1.66	2.34
Adj $\bar{X}$	6.29		5.64		5.81		5.71	

Source of variation	Between	Within	Total
Sum of squares pre-test	11.497	190.718	202.215
Sum of squares post-test	11.023	253.992	265.015
Degrees of freedom	3	61	64
Adjusted mean squares	1.422	3.797	
Degrees of freedom	3	60	63
Adjusted F	.3746 non significant		

Factor Q_2 (Table 23) does not present itself as being significant at

all. The mean scores by and large are close to the general population mean and the variability in scores is not large.

Table 23
Analysis of Covariance - Factor Q_2

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	5.55	5.16	5.11	4.27	4.92	5.85	5.39	5.00
S.D.	2.12	1.72	1.97	1.42	1.27	1.95	1.13	1.51
Adj $\bar{X}$	5.16		4.27		5.85		5.00	

Source of variation	Between	Within	Total
Sum of squares pre-test	3.802	248.751	252.553
Sum of squares post-test	20.112	175.825	195.938
Degrees of freedom	3	61	64
Adjusted mean squares	6.695	2.930	
Degrees of freedom	3	60	63
Adjusted F	.228 non significant		

Factor Q_3 is of significance in both delinquency and criminality. However, as may be observed (Table 24) such a significance is not readily apparent from the mean scores for the groups. In the case of this factor a number of serendipitous findings emerged in the examination of the data. The most substantial, and as it turned out in a general survey, the most consistent, is that Native Indian inmates attain abnormally high scores on this factor. The two scores of 10 in Group I were attained by Native Indians. A further finding was that the more sophisticated criminals who had been involved in crimes requiring fairly elaborate planning also attained high Q_3 scores.

It is possible that the particularly low mean scores reported by researchers in the U.S. and the mean score on this factor given by Cattell (Appendix A) for convicted criminals arises because many of the U.S. delinquents and criminals are Negro, and it is known that the Negro has a

poor self concept. The inclusion of a percentage of 33-1/3 Negroes, which is the proportion of Negroes in the U.S. prisons, would thus have the effect of reducing the mean score on this factor.

Table 24
Analysis of Covariance - Factor Q3

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	5.11	6.50	5.72	4.38	5.14	5.00	4.86	5.46
S.D.	2.62	2.11	2.23	1.91	2.75	2.69	2.24	1.77
Adj $\bar{X}$	6.53		4.25		5.02		5.56	

Source of variation	Between	Within	Total
Sum of squares pre-test	6.701	300.836	307.538
Sum of squares post-test	42.350	296.511	338.561
Degrees of freedom	3	61	64
Adjusted mean squares	16.100	4.579	
Degrees of freedom	3	60	63
Adjusted F	3.515	$p < .05$	

On the other hand the high score of the Canadian Indian may render the means for Canadian criminals high because of the large proportion of Indians in correctional institutions.

A further surprising finding was that the high scoring Indians tended to attain scores more than two or three stens lower on the post-test whereas the sophisticated high scoring criminal did not tend to drop in attained score. This finding was substantiated in a follow up.

Interestingly enough the tendency for the two Matsqui control groups was towards an enhancement of self concept, if case two of Group III is ignored, a Native Indian case.

There was a significant increase in the mean score of the experimental group in which twelve cases improved and one case remained static, five cases declining. However, in the William Head Group II there

was an undesirable deterioration in twelve of the eighteen cases. Table 25 (Appendix C) shows that the appreciation was significant in the case of Group I when the means are compared to each of the other group means except that of Group III.

Factor Q_4, (Table 26), indicates that on this factor Group I was very different to the other groups. The mean for Group I coincides with the general population mean, whilst all other groups are higher. The one high scoring case in Group I was derived from an inmate psychiatrically diagnosed as a paranoid. The same individual attained a score of 10 on Factor O, confirming a psychiatric disorder rather than a social disorder. In this one case there was a reduction in the level of anxiety, as may be observed, (Factor Q_4), but no decrease in guilt proneness, (Factor O).

Table 26
Analysis of Covariance - Factor Q_4

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	5.50	4.44	6.50	6.50	7.00	7.07	6.13	6.19
S.D.	2.12	2.01	1.79	1.71	2.32	2.34	2.14	1.92
Adj $\bar{X}$	4.82		6.37		6.68		6.25	

Source of variation	Between	Within	Total
Sum of squares pre-test	19.328	264.733	284.061
Sum of squares post-test	64.711	240.273	304.984
Degrees of freedom	3	61	64
Adjusted mean squares	10.996	2.872	
Degrees of freedom	3	60	63
Adjusted F	3.828	$p < .02$	

It is of interest to observe that the high scoring inmates on Factor O scored high on Q_4, the two factors being part of the neurotic-psychotic syndrome.

In all groups there was a tendency for a decrease in the score on this factor. It would appear that the security of the prison setting helps allay anxiety, frustration and tension. The greatest decrease occurred in the case of Group I, the mean of which declined 2.39 stens. This decline was significant at the .005 level even after the initial difference had been taken care of by analysis of covariance. Table 26A (Appendix C) indicates that there was a significant difference between the means for Group I and each other group.

The Significance of the Pre-test, Post-test Comparisons

In order to clarify what changes took place in the groups, Tables 27, 28, 29, and 30, Appendix C, have been prepared to indicate the t ratios of changes occurring.

Table 27 refers to Group I and shows that there was a significant change in the mean scores for Factors C, E, G, H, I, O, Q_3 and Q_4, in the direction predicted. Except for Factor H these are the factors which are contended to be specific to criminality, and furthermore they are representative of the facets of behaviour which are reported to have changed for the better in the institutions in which programmed instruction has been utilized; as set out in the review of the research in this study.

It is felt that this study substantiates the claims made by the researchers who have reported, albeit rather loosely, changes that do occur under a regime of programmed instruction.

In contrast, Table 28 sets out the changes occurring in the mean scores on the 16 PF for Group II, non school, William Head Institution. There are two significant changes occurring for this group, Factor G and

Factor Q_3, unfortunately, the changes are in the wrong direction indicating that there is a greater tendency towards criminality than at the time of the pre-test.

Table 29 shows that the Group III mean changed significantly on two factors, L and O. There was a significant change on Factor O guilt proneness, at the .02 level of significance. This seems to indicate that although some slight modifications in personality do occur under standard classroom conditions, they are not such substantial changes as occur in the programmed instruction setting. A possible alternative explanation may be that the specific type of personalities involved in drug addiction are not so amenable to change as are those in the regular type criminal. It is of some interest to note that there appears to be an increase in the level of suspiciousness with this group. Such a change is difficult to account for without knowing more about the specific group and the specific situation.

In the case of Group IV (Table 30), changes occurred on Factor H only, and on that factor the inmates did not attain the general population mean. In both of the Matsqui cases there was no indication of a general decrease or deterioration, and in the case of the school group, Group III, there is sufficient evidence to say that academic schooling is of more benefit than the general training programme at that institution.

On the overall picture it would appear that as far as can be seen from the data derived, academic education is a viable force towards rehabilitation, and particularly when that education is rapid and massive,

massed learning, the result is such that great benefits are reaped insofar as the modification of personality as measured by the 16 PF is concerned.

The Hidden Figures Test Data

The Hidden Figures Test data reveals a startling difference between the drug addicted criminal and the non-addicted criminal. In Group I there were seven people who attained a raw score of greater than 50%. In Group II six people attained 50% or greater, Group III only two, Group IV, only three.

Of further interest was the fact that the high scores in the William Head groups were obtained by bank-robbers, and the highest score of all by an embezzler. The embezzler completed the whole test in seven minutes; less than a quarter of the allotted time and turned in a perfect score.

The data derived from the analysis of covariance of the Hidden Figures Test is given in Table 31 which demonstrates the large differences between the mean score on the pre-test of Group I and the pre-test means of the Matsqui groups.

Table 31
Analysis of Covariance Hidden Figures Test

	Groups							
	I		II		III		IV	
	pre	post	pre	post	pre	post	pre	post
$\bar{X}$	14.6	21.1	11.7	13.1	7.57	7.92	9.06	12.40
S.D.	8.40	9.74	7.97	8.57	6.49	5.56	7.54	7.64
Adj $\bar{X}$	18.13		12.58		10.77		14.07	

Source of variation	Between	Within	Total
Sum of squares pre-test	464.734	3408.253	3872.988
Sum of squares post-test	1476.941	4102.812	5579.753
Degrees of freedom	3	61	64
Adjusted mean squares	148.923	29.470	
Degrees of freedom	3	60	63
Adjusted F	5.053	$p. < .005$	

On the basis of the pre-test means it might be presumed that there is a difference between those choosing to attend school and those not so choosing. However, Table 31 t-test values for the means of the pre-test on the HFT, indicates that this is not so, and that there is no significant difference between the two types. There is, however, a significant difference between the Group I mean score and the mean scores of the Matsqui groups, Group III and Group IV.

Table 32 indicates that at post-test there was a significant difference between the mean attained by the William Head school inmates, and the mean attained by any other group. It is of interest to observe that for some inexplicable reason the mean of the Matsqui non-school group, (Group IV) also increased; so much so that there is an observable and significant difference between the two Matsqui groups.

The increase in mean scores for the groups were: 6.5 score points for Group I, .90 of a score point for Group II, .33 of a score point for Group 3, and 3.40 score points for group IV. However, Table 33, Dunnett's t Test for Differences Among Means indicates that the only actual significant differences are in the case of Group I compared to all other means. No other group comparisons amount to significance, but in the case of the comparison of any other post-test mean with the post-test mean of Group I there is a difference which would occur by chance less than one time in one hundred and in one case only one time in a thousand.

Conclusions

Hypothesis I: (If the personality of the criminal is of a specific pattern, and if the inmates of the penal establishments used in this

study will be found to be of that specific criminal type. Specifically the mean scores of the groups will show characteristic deviations from the mean on Cattell's 16 PF on Factors C, I, G, E, O, Q_3, and Q_4 if the assumptions specified are in fact true.) was partially substantiated in that of the factors specified as significant in the criminal personality all were found to be significant in the groups with the exception of Factors I and E. The mean of the scores attained on Factor E by the William Head groups did not appear to be significantly different to the general population mean, (5.5). A significant mean variation is considered to be greater than one sten and such was only attained by the Matsqui groups.

Furthermore it may be observed, that although Factor Q_4 does appear as higher than the general population mean for three of the groups, Table 3, it is not significant in the case of Group I, nor does it reach significance in the case of the 64 William Head inmates routinely tested (Table 1).

However, on all other factors specified as important in criminality, it is observable that the means attained by the groups are similar to the means given by Cattell (Appendix A). Taking the means obtained and comparing them to the means of the groups set out by Cattell (Appendix A) there is no doubt that the groups fit the pattern of category 11 of Cattell's Typical Clinical Profiles, Convicted Criminals in Prison.

A comparison of the groups at the two institutions shows that the means are not dissimilar for the two separate sets in the two institutions. The pre-test means for Group I are not very dissimilar from the means of Group II except of Factors Q_4, M, and G. Group I had less ergic tension

than the other groups, lower ego strength, and more imagination. Lower ego strength denotes a more criminal pattern, and autia is not considered important in criminality. However, it may be speculated that there is a difference in the inmates who choose to attend school if only on these three factors.

Hypothesis II: (If the majority of criminals are naive criminals and the subjects of this study are representative of the majority of criminals, then an analysis of the cognitive style of the sample of inmates will reveal that they are of the global type.) was only partially borne out in that more than a third of the inmates in Group I attained a fifty percent score as did the inmates of Group II. In this case although there is a tendency for these two groups to be more inclined to the global style rather than the analytic, but not greatly so. However, the drug addicted criminals showed quite definitely to be global rather than analytic.

Hypothesis III: (If cognitive style is mutable, by means of massed learning, towards the analytic end of the continuum, then after the experimental exposure to massed learning there should be a shift in the mean score obtained in a test of cognitive style towards the analytic end of the continuum.) seems to have been substantiated in that the post-test mean is above the fifty percent level by 5.1 score points. However, if sheer massed learning is held to be accountable for such a shift, then there should have been a similar but smaller shift for the group undertaking academic instruction at Matsqui, and such was not the case. Furthermore, if academic instruction is responsible for the increase, then the substantial and significant increase attained by Group IV is inexplicable

as this group was not subjected to academic instruction.

Hypothesis IV: (If programmed instruction is more efficient in terms of speed of learning, and if learning brings about a change in personality and a generalised improvement in behaviours, then the group exposed to massed learning by programmed instruction should show a greater change in personality profile than the groups not so exposed.) which involves the very heart of the research was fully substantiated. There was a change in the measured personality profiles, and, furthermore, that change was in a positive desirable direction and was substantial. It is felt that the experiment fully substantiates the claims made by the various correctional institution educators who have utilized programme instruction and who have reported positive changes in behavioural patterns after such usage.

Chapter Six

In the previous chapters an attempt has been made to clarify that which was already suspected by the experimenter, and that which has been indicated previously by correctional educators working with programmed instruction. An attempt has been made to review and delineate the characteristics of the criminal personality, and to predict which factors could be modified through massed learning by programmed instruction. The facets of personality were measured, and data was presented which seemed to indicate that most of the predictions were substantiated.

Two further tables (34 and 35) have been prepared in order to summarize the personality factors considered by Cattell to be significant in criminality, and the factors considered as significant in criminality by the majority of the researchers whose work has been reviewed. (Tables 34 and 35).

Table 34 shows the factors which have been indicated by the researchers as significant in the criminal personality, and indicates whether the majority of the researchers suggest that the variation on the factor is above or below the general population mean. The table also shows the factors and directions which were hypothesized in this present study. This table also includes the disposition of the four groups utilized in

this study at pre-test.

Referring back to the hypotheses set out in chapter four and studying Table 34 reveals that the prediction that the groups would follow the pattern of significance for criminality on Factor C, (Emotionality), E, (Dominance), G, (Super Ego Strength), I, (Femininity), O, (Anxiety), Q_3, (Self Sufficiency), and Q_4, (Tension), was supported in the case of factors C, G, O, and Q_4. In the case of the two Matsqui groups the prediction that Factor E would be high was substantiated. If the mean score for the four groups had been calculated for Factor E, then the prediction that criminals tend to score high would have been substantiated. Factors Q_3 and E, were not found to conform to the prediction.

Table 35 contains data which shows that certain of the predictions which were made in the body of the study were substantiated. It is observable that C, emotionality, showed an increase from a low score to a normal level in the case of Group I, the programmed group. This increase is as desired and as was predicted. G, super-ego strength, also reached a normal mean score for the programmed group, whilst the other groups remained at a low level. In one case, Group II, there was a decrease in the mean G score, an undesirable outcome. Factor O, anxiety, appears to have decreased for three of the groups, I, III, and IV, and this might lead to the speculation that the decreases for the Matsqui groups were brought about by a combination of psycho-therapy and academic schooling, a proposition that is worthy of more attention and research. In the case of Group II no such decrease, as is desirable, was found, and perhaps the inference might be made that even in a minimum secur-

ity institution a farily solid regime of therapy of some sort is necessary if the level of anxiety is to be reduced.

Much is made by the researchers in delinquency and criminality of the construct 'self concept'. It is reported as being low in delinquents and criminals but such is not found to be the case in this study as indicated by Tables 34 and 35. The pre-treatment scores for both William Head groups and one Matsqui group shows low normality on this factor (Q_3). However, in one case, that of Group IV, the Q_3 score is lower than ½ sten below the general population mean. It is possible that this figure is lower than the others because of sampling. Possibly a larger sample would have revealed that there is no great difference from the population mean on this factor in the case of Canadian criminals.

Table 35 indicates that in the case of the programmed instruction group (Group I), there was an increase in the mean self concept score (Q_3) from a low normal score, to a high normal score, an increase of almost 1½ stens. Tables 34 and 35 also show that there was some differences between the groups on Factor Q_4, tension Group I differed from the other three groups at pre-treatment testing in having a normal mean level of tension, whilst the other groups were above normal. After treatment the level of tension for Group I had reduced to a level significantly below the mean of the general population, whilst the other groups had remained high.

Limitations of the Study

There are a number of shortcomings in this research which have been of concern to the experimenter. The area of principal concern centers on the fact that there was really no way of working with randomly assigned

groups, and it is not felt that utilising a statistical control for this shortcoming fully compensates for this. It is felt that many 'hard nosed' researchers would tend to discount, in part, some of the findings of this study because of the aspect of non-random assignment.

Furthermore, the experimenter had no way of clearly measuring whether or not the groups used as a comparison to the programmed instruction group took the tests as seriously as the experimental group did. There is, additionally, the problem of willingness. Possibly willingness to attend school is a factor which is not measurable by the instruments used and which may be very important in that willingness to attend academic school is indicative of a desire to reform which may be lacking in those not willing.

The question of the experimenter's personality enters into the matter of limitations also. Is the fact that the teacher who is interested enough to prepare a research on his methods demonstrating the characteristic of caring for his subjects, and does that aspect of caring call forth a response which the subjects feel the teacher desires? This question could partially be answered by having two groups taught by the same experimenter, one group taught by programmed instruction and one group taught by another method.

However, some defence is offered for the limitations proposed in that willingness is also evident in the case of the Matsqui school group, and they did not show the same personality modifications as the William Head school group did. Furthermore, it would be arrogance indeed to speculate that the experimenter in this case and the other researchers

working with programmed instruction are the only ones that care, or have some personal qualities which generate personality modifications or behaviour changes.

The Behavioural School and the Cognitive School

It has been pointed out to the experimenter that although he studiously avoids attributing the changes to conditioning, eschews crediting operant conditioning of having great effect, and appears to credit change to cognitions, the instruments which he suggests will modify behaviours are behavioural instruments. This point is well taken and is a fact which the experimenter had missed. However, it is felt that although programmed instruction does stem from research in the field of operant conditioning that does not of necessity limit the effect of programmed instruction to the operant conditioning setting. Nor is it felt that it is improper from the educators point of view to propose a marrying of the two orientations, behaviouristic and cognitive, to arrive at a proposition for personality modification.

Inferences Derived from the Study

The study seems to indicate that learning, principally via programmed instruction is an efficient way of bringing about a modification in criminal personality. It would seem that if this is true, and if the purpose of imprisonment is to rehabilitate and reform the prisoner as well as to protect the public, and if personality change is indicative of reformation then far greater attention should be given to academic correctional education than is presently the case.

At the present time Canadian Penitentiaries stress vocational train-

ing rather than academic education on the basis that the criminal needs some trade or calling in order that he may stay out of conflict with the law. It is undoubtedly true that lack of trades training may impede the offender in his quest for a legal livelihood, but unless it can be shown that vocational training prepares the criminal to be willing as well as able to live lawfully then it fails in the purpose of reformation.

However, academic education by programmed instruction and vocational training need not be mutually exclusive, there is no reason at all that the greater part of vocational training should not be via programmed instruction, and there is no reason that programmed instruction academic subjects and programmed instruction vocational subjects cannot take place concurrently.

The underlying purpose of this study has been to draw attention to the fact that it is fairly well known to correctional educators who have worked with programmed instruction that such instruction leads to an improvement in behaviours and a reduction in recidivism. It has been demonstrated that there appears to be such an effect in the case of a minimum security institution which was the setting for this study.

It is hoped that this study will encourage other correctional educators to investigate programmed instruction further and to test for themselves the hypotheses set out in the study. Further it is hoped that the findings of this study will encourage those in charge of correctional education to take another and a longer look at penitentiary training and educational systems as they are at the present time, and as they might be, given encouragement and funds.

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APPENDIX A

TYPICAL 16 PF CLINICAL PROFILES (IN STENS)

Description of Clinical Group	N	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3	Q4
1. Neurotics (all types in population proportions)	272	5.8	5.0	3.1	4.3	3.5	4.8	4.1	7.0	6.9	6.5	5.2	8.1	5.0	6.2	4.5	7.9
2. Anxiety Reaction (Neurotics)	80	6.0	5.2	2.7	3.9	3.5	4.5	4.3	7.1	7.4	6.4	5.4	8.5	5.6	6.2	4.4	8.0
3. Depressive Reaction (Neurotics)	70	5.4	5.0	2.7	4.4	3.4	5.3	3.5	7.4	6.5	7.0	5.5	7.5	5.2	6.4	4.5	8.1
4. Obsessive-Compulsive (Neurotics)	15	6.1	5.6	4.8	3.9	3.7	4.9	4.0	7.1	5.9	6.3	4.7	7.7	4.7	5.7	4.1	7.6
5. Conversion Reaction (Neurotics)	12	5.0	6.0	4.0	5.5	4.2	5.5	4.3	5.3	6.1	5.1	5.9	7.4	4.6	5.7	4.7	8.4
6. Inadequate or Immature Personality 16M/10F	26	5.5	4.2	4.4	5.1	4.9	5.4	3.7	5.8	6.7	7.3	5.5	7.7	5.8	6.1	5.2	7.3
7. Fathers of Children Attending a Child Guidance Clinic	69	6.4	4.5	4.1	4.1	3.2	4.6	5.4	7.2	6.3	6.9	5.5	7.1	5.5	6.4	5.3	7.3
8. Mothers of Children Attending a Child Guidance Clinic	69	6.1	5.2	4.5	4.5	5.1	5.2	6.0	5.6	6.4	6.4	5.5	6.3	6.3	5.1	4.5	6.1
9. Alcoholics M	696	5.7	4.2	3.5	4.2	3.8	4.8	4.4	6.4	6.4	6.9	4.9	7.8	4.5	6.0	4.9	7.9
10. Narcotics Addicts M (almost all)	275	6.6	3.4	3.3	4.5	4.4	4.9	5.7	6.9	6.3	7.1	4.5	6.7	5.4	5.6	5.5	6.3
11. Convicted Criminals, in Prison M	891	5.6	4.1	3.6	4.9	4.5	4.5	5.5	6.4	6.3	6.9	5.2	6.9	5.4	6.1	4.8	6.6
12. Sex Crime Convicts M	35	4.8	3.8	3.1	4.5	4.2	4.9	5.1	6.5	7.0	6.7	5.6	7.1	5.2	5.3	5.4	6.6
13. Homosexuals M	136	6.5	3.5	2.6	5.0	4.9	3.6	4.5	7.6	7.3	7.7	5.3	7.8	6.1	6.6	4.9	7.3
14. Exhibitionists M	32	4.9	6.1	2.4	6.2	3.8	3.6	3.8	6.4	7.4	7.2	5.8	8.0	6.3	5.2	3.2	8.3
15. Delinquents, including Sex Delinquents 23M/104F	127	5.1	3.4	4.6	6.0	5.2	4.6	4.4	6.3	6.5	5.8	5.9	5.7	4.8	5.2	4.4	6.6
16. Sociopaths M	28	7.1	---	3.0	4.9	5.4	4.8	4.0	5.3	5.8	5.0	4.6	6.8	4.7	5.0	3.4	6.5
17. Psychosomatic Disorder, Somatization Symptoms 31M/2F	33	5.0	5.0	4.8	5.9	4.4	5.8	4.7	4.1	5.2	5.4	6.4	6.0	4.7	6.2	4.9	6.5
18. Blind, or Seriously Disabled Visually 119M/63F	182	5.2	---	5.4	5.3	4.6	6.1	4.6	6.0	6.3	5.2	6.0	6.6	5.4	5.1	5.9	5.7
19. Deaf, or Seriously Hard of Hearing	37	4.3	3.7	4.8	5.9	4.3	6.4	3.9	5.0	6.2	5.6	7.0	6.4	5.8	5.3	4.6	6.1
20. Physical Disability Interfering with Locomotion 79M/31F	110	5.3	4.4	5.4	5.5	4.4	6.4	4.7	5.4	6.1	5.1	6.7	6.6	5.1	5.3	4.8	6.6
21. Epileptics mainly M	22	5.0	4.1	4.5	5.7	4.8	6.4	4.9	5.6	5.7	5.4	6.1	6.4	5.6	4.6	5.2	6.8
22. Speech Problems 13M/3F	16	4.5	4.6	6.4	5.2	4.6	5.5	4.8	5.1	6.0	5.3	6.7	6.2	4.4	5.2	4.1	6.2
23. Psychotics (all types in population proportions)	531	4.8	3.6	4.1	5.6	4.8	5.6	4.6	5.8	4.1	5.5	5.1	6.3	5.5	5.0	5.3	5.6
24. Schizophrenic Reaction (Paranoid) 17M/15F	32	4.8	5.7	5.5	4.5	3.8	6.0	5.2	5.4	6.1	5.8	5.3	5.2	5.3	6.0	7.1	4.9
25. Schizophrenic Reaction (Non-paranoid) 36M/63F	99	5.7	4.6	4.6	4.5	3.8	5.5	4.6	5.8	5.6	5.6	4.9	6.0	5.1	6.0	6.1	5.3
26. Schizophrenic Reaction (Mixed sample) 53M/78F	131	5.5	4.9	4.8	4.5	3.8	5.6	4.7	5.7	5.7	5.6	5.0	5.8	5.1	6.0	6.3	5.2

INSTITUTE FOR PERSONALITY AND ABILITY TESTING, 1602 CORONADO DRIVE, CHAMPAIGN, ILLINOIS 61820
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TYPICAL 16PF OCCUPATIONAL PROFILES (IN STENS)

Description of Occupational Group	N	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3	Q4
1. Accountants	92	7.0	6.2	4.9	5.5	4.9	6.4	5.8	4.1	6.6	6.0	6.5	5.4	6.9	8.4	5.8	5.2
1a. British Accountants	90	7.1	6.3	5.4	5.2	4.5	6.0	4.7	5.1	4.9	4.8	5.7	6.0	7.1	6.2	5.3	5.6
2. Administrators, University	69	4.8	6.7	7.4	6.7	3.9	3.8	7.2	6.8	3.6	4.9	5.8	3.2	5.7	5.8	7.2	4.7
3. Aircraft Engineering Apprentices	145	3.4	5.2	7.4	5.9	4.9	5.4	4.8	5.0	4.8	4.4	4.2	4.1	5.0	4.6	6.4	5.3
4. Airmen	245	6.4	6.0	7.5	9.2	5.4	4.2	9.0	4.0	6.7	5.0	6.6	4.6	5.6	7.9	6.1	6.6
5. Athletes (Olympic Champions)	41	5.6	6.0	7.6	7.8	6.4	3.9	7.5	6.5	4.7	5.6	5.0	3.3	4.9	5.1	5.9	6.1
6. Business Executives	178	7.8	5.8	5.6	6.0	5.3	5.3	6.6	5.7	5.3	5.8	6.2	5.9	6.5	5.5	5.9	5.7
7. Clerks (secretaries and stenographers)	57	6.0	5.6	5.2	5.2	4.6	5.2	5.6	5.7	4.9	5.7	4.8	5.3	5.1	5.6	5.6	5.6
8. Editorial Workers	46	5.9	5.6	5.9	5.3	5.9	4.5	5.9	7.2	6.3	7.1	4.6	6.4	5.7	5.6	5.8	7.3
9. Farmers	84	5.9	2.9	3.0	3.6	2.8	5.0	4.5	6.9	6.7	6.9	5.0	7.7	4.9	6.4	5.7	7.0
10. Housewives	48	6.5	4.7	4.4	4.6	4.2	4.7	5.5	7.1	5.4	6.0	5.1	6.3	5.6	5.7	5.4	7.0
11. Industrial Plant Foremen	71	5.4	5.9	4.7	5.0	4.1	6.0	5.0	5.1	5.6	5.6	6.0	6.0	6.4	5.8	5.2	5.8
12. Midshipmen (Freshmen)	1135	5.8	6.1	6.6	6.1	6.4	6.3	6.1	4.1	5.4	5.5	7.4	4.3	5.6	5.3	6.0	6.0
12a. Midshipmen (Seniors)	110	6.0	6.0	6.4	6.0	6.1	6.3	5.9	4.0	5.1	5.3	7.6	3.3	4.9	5.2	6.1	5.9
13. Nurses	177	5.4	5.6	6.5	5.3	5.9	4.5	5.4	6.0	5.5	6.1	4.9	5.0	5.8	4.5	5.3	5.7
14. Policemen (City Police Departments)	64	6.1	5.2	5.7	6.5	5.5	5.9	5.0	3.4	5.8	4.5	5.6	5.4	5.4	5.2	5.8	5.8
15. Priests	40	6.4	6.0	7.7	6.9	5.9	4.5	6.1	7.5	4.5	5.5	1.8	3.4	2.9	4.5	5.3	6.2
16. Professors, University	81	5.0	8.0	4.5	3.5	2.6	3.1	4.7	7.1	6.1	6.9	5.3	5.2	7.5	7.8	6.2	5.2
17. Psychiatric Technicians	75	6.5	5.5	7.2	5.2	4.5	4.8	6.6	7.3	4.5	4.6	4.4	4.2	4.8	5.0	7.1	5.2
18. Scientists, Research	144	3.4	6.8	6.9	7.2	3.5	3.4	6.5	7.1	4.1	5.6	5.5	3.6	6.2	6.5	6.8	5.1
19. Sales Supervisors	137	7.2	5.7	5.4	6.3	6.0	6.3	6.7	3.8	5.8	5.4	6.5	4.9	5.6	5.0	5.5	5.2
20. Salesmen	284	6.5	5.1	5.4	5.8	5.9	6.2	5.7	4.3	5.3	4.6	5.9	5.2	4.8	5.1	5.8	5.4
21. Store Managers	107	6.9	4.4	4.2	4.7	4.0	5.8	5.1	5.6	6.1	5.7	5.7	6.5	5.4	5.0	5.6	6.3
22. Teachers (Elementary and Junior High School)	59	7.8	6.1	7.1	5.6	6.2	4.4	7.1	7.2	4.5	5.2	5.5	4.5	4.5	4.8	6.2	6.4
23. Time Study (Efficiency Experts)	77	6.6	6.4	5.0	6.0	5.6	6.3	6.0	4.4	6.2	6.4	7.9	5.0	6.8	6.2	6.0	4.8

The factors showing noteworthy weights for discrimination are underlined with a double underlining where the difference is particularly relevant.

—— means more than ½ standard deviation out from the mean

═══ means more than a full standard deviation out from the mean

APPENDIX B

Scheme of Track #1 - The Metchosin Plan

Communication (Cognition)

Programmed Reading - Cynthia D. Buchanan & M.W. Sullivan

Book 1 — McGraw-Hill, Ltd.
Book 2
Book 3
Book 4
Book 5
Book 6
Book 7

Communication (Expression)

Word Clues — Educational Development Laboratories, Ltd.,
Associated Visual Services Ltd.,
1240 West Broadway,
Vancouver, B.C.

Book G
Book H
Book I
Book J

English 2200 — Blumenthal, Harcourt Brace World Ltd., and/or
English 2600 — " " " " "
Spelling Improvement - Fergus, McGraw-Hill, Ltd.
Effective Letters - Fergus, McGraw-Hill, Ltd.

Computational Skills

Programmed Mathematics for Adults - N.W. Sullivan, McGraw-Hill, Ltd.

Book 1 - Basic Addition
Word Problems in Basic Addition
Word Problems in Advanced Addition
Book 3 - Subtraction
Word Problems in Subtraction
Book 4 - Multiplications
Word Problems in Multiplication
Book 5 - Division
Word Problems in Division
Book 6 - Fractions
Word Problems in Fractions
Book 7 - Decimals
Word Problems in Decimals
Book 8 - Measurement
Word Problems in Measurement

Book 9 - Consumer Mathematics
Word Problems in Consumer Mathematics
Book 10 - Personal Mathematics
Word Problems in Personal Mathematics
Book 11 - Advanced Personal Mathematics
Book 12 - Understanding Algebra
Book 13 - Using Algebra
Book 14 - Using Geometry
Book 15 - Using Trigonometry

Basic Science

CHEMISTRY

Introduction to Chemistry - T.M.I. Division of the Grolier Corporation

Volume 1
Volume 2
Volume 3

A Programmed Primer in Chemistry - Programming Branch of the Technical Writing Division of the William Head Institution.

Series A - Oxygen, Hydrogen, Water, Laboratory Preparation of O_2, H_2

Series B - The Organization of Chemistry

Series C - The Nitrogen Groups, The Halogens

Physics

General Science Programmed Learning Laboratory

Accelerated Instruction Methods Corp., Published by: The MacMillan Co., New York.

Book 1 - Motion
Book 2 - Force
Book 3 - Energy & Work
Book 4 - Simple Machines
Book 5 - Light Flow & Energy
Book 6 - Light
Book 10 Earth

Mechanics - TEMAC (Encyclopedia Britannica) Publications

Introductory Chemistry - (TEMAC)

Basic Mathematics - (TEMAC)

Introduction to Sets - Holt Rhinehart

Scheme of Track #2 - The Metchosin Plan

Communication

English 3200 - Bluementhal, Harcourt Brace World Ltd.

Effective Letters - Reid, McGraw-Hill

Spelling Improvement - Forgus, McGraw-Hill

English Review Manual - Gowen, McGraw-Hill

Word Clues - Educational Development Laboratories, Ltd.
Book - K Book - L Book - M

Computational Skills

Decimals - Hauck, McGraw-Hill

Percentages - Hauck, McGraw-Hill

A Program in Contemporary Algebra - Heimer, Kocher, Lotts, (Holt, Rinehart)

Book 1 Book 2 Book 3 Book 4 Book 5

First Year Algebra - Temac Encyclopaedia Britannica

Second Year Algebra - Temac Encyclopaedia Britannica

Algebra of Fields & Related Fields - Temac Encyclopaedia Britannica

Introductory Calculus - Temac Encyclopaedia Britannica

Trigonometry - Temac Encyclopaedia Britannica

Plane Geometry - Temac Encyclopaedia Britannica

Alternate

Programmed Business Math - Huffman, McGraw-Hill

Science

Introduction to Chemistry - Temac Encyclopaedia Britannica

Balancing Chemical Equations - Powell, Prentice-Hall

Chemical Formulas & Names - Powell, Prentice-Hall

Molecular Weight Calculations - Powell, Prentice-Hall

Chemical Concepts - Jay Young, Prentice-Hall

Selected Principles of Chemistry - Jay Young, Prentice-Hall

Gases & Gas Laws - Renee Ford, - Holt, Rhinehart

APPENDIX C

Table 2

Mean Raw Scores and Mean Standard Scores-Stens- of Inmates at the William Head Institution (N=64)

Factor	Raw Scores	Sten Scores
A Sociability	9.68	5.84
B Intelligence	7.74	7.74
C Ego Strength	14.69	4.85 -
E Dominance	13.00	5.50 #
F Surgency	15.03	6.01 #
G Super Ego Strength	12.00	4.50 -
H Adventurousness	11.89	4.95
I Femininity	8.19	5.60 +
L Suspiciousness	9.55	6.27 +
M Unconcern	12.20	6.10 +
N Sophistication	10.58	4.58
O Anxiety	11.80	6.90 +
Q_1 Radicalism	10.30	5.65
Q_2 Self Sufficiency	9.70	5.36 #
Q_3 Self Control	11.02	5.51
Q_4 Tension	10.90	5.95 +

+ Higher than population mean and in accord with direction indicated in Cattell table of clinical scores

- Lower than population mean and in accord with direction indicated in Cattell table of clinical scores

Not in accord with Cattell table of clinical scores

Table 3

Test Retest Reliability Data for 16 P F., Form B. N=97. 6 days

Factor		Reliability
A	Sociability	.75
B	Intelligence	....
C	Ego Strength	.74
E	Dominance	.80
F	Surgency	.81
G	Super Ego Strength	.77
H	Adventurousness	.89
I	Femininity	.79
L	Suspiciousness	.77
M	Unconcern (Autia)	.70
N	Sophistication	.60
O	Anxiety	.81
Q_1	Radicalism	.70
Q_2	Self Sufficiency	.75
Q_3	Self Control	.62
Q_4	Tension	.87

Table 4

Mean Standard Scores (Stens) for Groups taking part in the Study. Pre-Treatment

Factor	Groups I M	I SD	II M	II SD	III M	III SD	IV M	IV SD
A	5.27	2.67	6.16	2.04	6.92	1.62	5.80	2.18
B	7.66	1.61	7.33	2.06	6.78	2.07	6.80	1.97
C	4.66	1.96	4.27	1.63	4.00	1.52	3.73	2.21
E	5.83	1.46	5.27	2.37	7.28	1.69	6.60	1.81
F	6.50	2.02	6.38	1.93	6.71	2.53	5.53	2.17
G	3.50	1.86	4.72	2.36	3.50	1.99	3.46	1.65
H	4.44	2.26	4.55	2.12	4.50	2.14	3.86	2.07
I	5.77	1.83	5.50	2.12	5.35	1.78	5.00	1.46
L	6.22	1.77	6.11	1.91	5.85	2.07	6.33	1.53
M	6.88	1.91	5.66	1.49	6.85	2.00	6.33	2.07
N	5.11	2.25	3.72	1.45	5.35	1.84	5.60	1.84
O	6.94	2.01	7.11	2.03	7.28	1.64	6.06	2.46
Q_1	5.84	1.82	4.77	2.01	5.42	1.65	5.20	1.66
Q_2	5.61	2.12	5.22	1.97	5.00	1.27	5.60	1.13
Q_3	5.11	2.16	5.72	2.23	5.14	2.75	4.86	2.24
Q_4	5.50	2.12	6.50	1.79	7.00	2.32	6.13	2.14

Underlined scores one sten or greater from the mean

Table 9

t-Test for Difference among Means- Factor C

Group vs Group		Mean- Mean	Difference	p
I	IV	5.91 - 3.79	2.12	<.01
I	III	5.91 - 3.72	2.19	<.01
I	II	5.91 - 4.41	1.50	<.01
II	IV	4.41 - 3.79	0.62	n.s
II	III	4.41 - 3.72	0.69	n.s
III	IV	3.72 - 3.79	0.07	n.s

t for p <.01 One tailed test = 2.39 x .56 = 1.33

t for p <.05 One tailed test = 1.67 x .56 = 0.94

Critical difference for p <.01 = 1.33

Critical difference for p <.05 = 0.94

Table 13

t-Test for Difference among Means- Factor G

Group vs Group		Mean - Mean	Difference	p
I	IV	5.15 - 3.97	1.18	<.05
I	III	5.15 - 4.08	1.07	<.05
I	II	5.15 - 3.13	2.02	<.05
II	IV	3.13 - 3.97	.64	n.s
II	III	3.13 - 4.08	.95	n.s
III	IV	4.08 - 3.97	.11	n.s

t for p<.01 One tailed test = 2.39 x .60 = 1.43

t for p<.05 One tailed test = 1.67 x .60 =1.002

Critical difference for p<.01 = 1.43

Critical difference for p<.05 = 1.002

Table 15

t-Test for Difference among Means- Factor H

Group vs. Group		Mean - Mean	Difference	p
I	IV	5.61 - 5.03	0.58	n.s
I	III	5.61 - 4.62	0.99	n.s
I	II	5.61 - 4.20	1.41	<.05
II	IV	4.20 - 5.03	0.83	n.s
II	III	4.20 - 4.62	0.42	n.s
III	IV	4.62 - 5.03	0.41	n.s

t for p <.01 One tailed test = 2.39 x .501 = 1.43

t for p <.05 One tailed test = 1.67 x .501 = 1.00

Critical difference for p<.01 = 1.434

Critical difference for p<.05 = 1.002

Table 21

t-Test for Difference among Means- Factor O

Group vs Group		Mean - Mean	Difference	p
I	IV	4.55 - 6.02	1.47	<.01
I	III	4.55 - 6.03	1.48	<.01
I	II	4.55 - 6.61	2.07	<.01
II	IV	6.61 - 6.02	0.59	n.s
II	III	6.61 - 6.03	0.58	n.s
III	IV	6.03 - 6.02	0.01	n.s

t for p < .01 One tailed test 2.39 x .61 = 1.01

t for p < .05 One tailed test 1.67 x .61 = 1.46

Critical difference for p <.01 = 1.01

Critical difference for p <.05 = 1.46

Table 25

t- Test for Difference among Means- Factor Q3

Group vs Group		Mean - Mean		Difference	p
I	IV	6.53	5.56	0.90	n.s
I	III	6.53	5.02	1.50	<.05
I	II	6.53	4.25	2.12	<.01
II	IV	4.25	5.56	1.22	n.s
II	III	4.25	5.02	0.62	n.s
III	IV	5.02	5.56	0.60	n.s

t for p < .01 One tailed test = 2.39 x .84 = 2.00

t for p <.05 One tailed test = 1.67 x .84 = 1.40

Critical difference for p<.01 = 2.00

Critical difference for p<.05 = 1.40

Table 26A

t-Test for Difference among Means - Factor Q_4

Group vs Group		Mean - Mean	Difference	p
I	IV	4.82 - 6.25	1.43	<.01
I	III	4.82 - 6.68	1.86	<.01
I	II	4.82 - 6.37	1.55	<.01
II	IV	6.37 - 6.25	0.12	n.s
II	III	6.37 - 6.68	0.31	n.s
III	IV	6.68 - 6.25	0.43	n.s

t for p <.01 One tailed test = 2.39 x .58 = 1.39

t for p <.05 One tailed test = 1.67 x .58 = 0.97

Critical difference for p<.01= 1.39

Critical difference for p<.05= 0.97

Table 27

Table of t-Ratios Group I

Factor	Pretest Stens	Posttest Stens	t ratio	p
A Sociability	5.28	6.00	1.16	n.s
B Intelligence	7.66	8.00	0.68	.n.s
C Ego Strength	4.66	6.11	2.74	<.02
E Dominance	5.83	6.99	2.47	<.05
F Surgency	6.50	7.16	1.20	n.s
G Super Ego Strength	3.50	5.00	2.80	<01
H Adventurousness	4.44	5.66	3.14	<01
I Femininity	5.77	4.28	3.04	<01
L Suspiciousness	6.22	5.88	0.48	n.s
M Unconcern (Autia)	6.88	7.50	1.03	n.s
N Sophistication	5.11	5.22	0.19	n.s
O Guilt Proneness	6.99	4.55	4.00	<001
Q_1 Radicalism	5.94	6.50	1.30	.n.s
Q_2 Self Sufficiency	5.61	5.17	0.06	n.s
Q_3 Self Control	5.11	6.50	2.11	<.05
Q_4 Tension	5.50	4.44	2.48	<.05

Table 28

Table of t Ratios Group II

Factor	Pretest Stens	Posttest Stens	t ratio	p
A Sociability	6.16	5.93	0.50	n.s
B Intelligence	7.33	7.06	0.70	n.s
C Ego Strength	4.28	4.44	0.29	n.s
E Dominance	5.28	6.11	1.24	n.s
F Surgency	6.39	6.82	0.78	n.s
G Super Ego Strength	4.82	3.55	2.27	<.05
H Adventurousness	4.55	4.33	0.52	n.s
I Femininity	5.50	5.11	0.64	n.s
L Suspiciousness	6.11	6.44	0.71	n.s
M Unconcern (Autia)	5.66	5.77	0.213	n.s
N Sophistication	3.72	5.06	2.09	n.s
O Anxiety	7.11	6.77	0.74	n.s
Q_1 Radicalism	4.77	5.44	1.00	n.s
Q_2 Self Sufficiency	5.22	4.27	1.90	n.s
Q_3 Self Control	5.72	4.38	2.27	<.05
Q_4 Tension	6.50	6.50	--	--

Table 29

Table of t Ratios Group III

Factor	Pretest Stens	Posttest Stens	t ratio	p
A Sociability	6.92	6.71	0.45	n.s
B Intelligence	6.78	6.78	---	---
C Ego Strength	4.00	3.64	0.92	n.s
E Dominance	7.28	7.50	0.43	n.s
F Surgency	6.71	6.14	1.96	n.s
G SuperEgo Strength	3.50	3.92	0.93	n.s
H Adventurousness	4.50	4.71	0.578	n.s
I Femininity	5.35	5.00	0.66	n.s
L Suspiciousness	5.85	6.85	4.76	<.001
M Unconcern (Autia)	6.85	6.42	0.79	n.s
N Sophistication	5.35	5.85	0.70	n.s
O Anxiety	7.28	6.21	2.69	<.02
Q_1 Radicalism	5.42	5.85	0.75	n.s
Q_2 Self Sufficiency	5.00	5.57	0.84	n.s
Q_3 Self Control	5.14	5.00	0.18	n.s
Q_4 Tension	7.00	7.07	0.02	n.s

Table 30

Table of t Ratios Group IV

Factor	Pretest Stens	Posttest Stens	t ratio	p
A Sociability	5.80	6.26	1.06	n.s
B Intelligence	6.80	7.20	0.70	n.s
C Ego Strength	3.73	3.60	0.34	n.s
E Dominance	6.60	6.46	0.32	n.s
F Surgency	5.53	6.26	1.21	n.s
G Super Ego Strength	3.46	3.80	0.85	n.s
H Adventurousness	3.86	4.73	2.90	<.01
I Femininity	5.00	4.86	0.31	n.s
L Suspiciousness	6.33	5.66	1.43	n.s
M Unconcern (Autia)	6.33	6.20	0.36	n.s
N Sophistication	5.60	5.60	----	---
O Anxiety	6.06	5.73	0.68	n.s
Q_1 Radicalism	5.20	5.60	0.89	n.s
Q_2 Self Sufficiency	5.60	5.00	1.40	n.s
Q_3 Self Control	4.86	5.60	1.40	n.s
Q_4 Tension	6.13	6.20	0.01	n.s

Table 31

t- Test Values for the Pretest Means of the Hidden Figures Test

Group	vs Group	t ratio	t	p
I	IV	5.50/2.64	2.08	<.05
I	III	7.03/2.68	2.62	<.02
I	II	2.90/2.47	1.17	n.s
II	IV	2.60/2.60	0.00	n.s
II	III	4.13/2.63	1.56	n.s
III	IV	1.53/2.37	0.65	n.s

Table 32

t-Test Values for the Posttest Means of the Hidden Figures Test

Group vs Group		t ratio	t	p
I	IV	8.60/3.09	2.78	<.01
I	III	13.20/2.96	4.46	<.001
I	II	8.50/3.06	2.77	<.01
II	IV	0.10/2.85	0.04	n.s
II	III	4.70/2.66	1.76	n.s
III	IV	4.60/1.59	2.89	.01

Table 33

t-Test for Difference among Means H F Test

Group vs Group		Mean - Mean		Difference	p
I	IV	21.10	12.50	7.60	<.01
I	III	21.10	7.90	13.20	<.001
I	II	21.10	12.60	7.50	<.01
II	IV	12.60	12.50	0.10	n.s
II	III	12.60	7.90	4.70	n.s
III	IV	7.90	12.50	4.60	n.s

t for p <.001 Two tailed test = 2.27 x 3.46 = 7.85

t for p <.01 Two tailed test = 2.27 x 2.66 = 6.04

Critical difference for p <.001 = 7.85

Critical difference for p <.01 = 6.04

Table 34

Factors Considered Specific to Criminality Compared with Predictions Made and Groups Utilized in the Study.

(Pre-Treatment)

Factor	Cattell	Researchers	P'dctn	Groups I	II	III	IV
B	L	L	X	H	H	H	H
C	L	L	L	L	L	L	L
E	X	H	H	N	N	H	H
F	L	X	X	H	H	H	N
G	L	L	L	L	N	L	L
I	X	H	H	N	N	N	L
M	H	X	X	H	N	H	H
O	H	H	H	H	H	H	H
Q_3	X	L	L	N	N	N	L
Q_4	H	X	H	N	H	H	H

H = Significantly higher than the mean of 5.5

L = Significantly lower than the mean of 5.5

X = Factor not considered

N = Npt significantly different to the mean

Table 35

Factors Considered Specific to Criminality Compared with Predictions Made and Groups Utilized in the Study (Post-Treatment)

Factor	Cattell	Researchers	P'dctn	Group I	II	III	IV
C	L	L	+	N	L	L	L
E	N	H	-	H	N	H	H
F	L	X	X	H	H	N	N
G	L	L	+	N	L	L	L
I	X	H	-	L	N	N	N
M	H	X	X	H	N	N	N
O	H	H	-	L	H	N	N
Q_3	X	L	+	H	L	N	N
Q_4	H	X	-	L	H	H	H

H = Scores significantly higher than the mean of 5.5

L = Scores significantly lower than the mean of 5.5

N = Scores not differing significantly from the mean

X = Factors not considered

+ = Increase predicted

- = Decrease predicted

Table 36

The William Head Groups

	Group I	Group II
Life Sentences	2	1
Mean Sentence (years)	3.3	2.9
Mean Age	27.2	26.4
Offences		
Breaking and Entering	4	6
Robbery	3	4
Crimes of Violence	5	3
Traffic in narcotics	3	2
Forgery	3	3
Native Indians	2	2
First Offenders	2	2

Sten Scores Factor B

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
10	10	8	9	7	7	8	7
7	6	4	4	4	5	5	9
7	9	10	10	10	8	6	9
7	10	10	7	7	6	9	8
8	7	9	7	2	2	9	6
7	10	7	4	6	6	6	7
10	10	6	6	7	7	6	5
7	10	6	7	6	7	6	5
8	9	7	5	8	7	4	8
8	8	8	7	9	10	10	9
7	6	9	10	7	7	9	7
8	6	8	5	7	8	7	7
5	6	9	8	6	6	7	7
8	6	3	6	9	9	3	5
5	4	10	10			7	9
8	8	5	6				
10	9	7	8				
8	10	6	8				

Sten Scores Factor C

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
3	6	4	6	3	1	4	4
4	5	2	3	5	7	4	1
3	6	7	5	6	5	1	1
5	5	7	5	3	4	5	5
4	5	6	3	3	4	2	3
9	10	3	5	4	4	7	5
6	7	5	5	4	3	4	4
2	5	4	3	1	1	2	2
7	6	3	1	5	5	5	4
4	8	5	4	4	5	7	8
4	8	7	3	2	1	7	5
4	7	4	7	4	4	1	2
3	7	3	2	6	4	5	5
4	3	4	5	6	3	1	4
4	8	5	6			1	1
4	4	3	8				
7	3	2	5				
7	7	3	4				

Sten Scores Factor E

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
7	8	6	9	7	10	8	6
5	4	1	1	7	10	4	4
7	10	3	7	7	6	5	7
5	7	4	6	5	7	6	5
4	10	6	3	8	8	6	1
6	7	5	6	9	10	7	8
6	7	5	6	8	8	8	8
8	8	8	5	10	10	9	9
4	6	3	7	7	7	5	6
5	7	3	10	8	7	8	9
6	6	3	1	5	7	3	4
4	5	9	7	9	6	7	7
9	7	9	8	4	1	6	7
4	7	4	6	8	8	8	7
5	6	9	7			9	9
5	7	7	7				
7	8	5	5				
8	5	5	9				

Sten Scores Factor F

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
6	8	8	7	7	7	8	6
5	5	5	6	3	4	5	8
8	5	7	7	4	3	3	3
10	10	3	7	3	3	6	6
3	7	7	3	4	4	4	6
9	7	5	6	9	6	7	7
7	7	4	3	10	9	3	3
7	4	7	10	10	9	7	7
5	6	5	7	6	4	5	5
3	6	7	9	7	6	10	10
8	9	6	4	9	9	4	6
5	4	9	10	9	10	7	7
4	7	8	9	5	5	5	6
10	10	5	5	8	7	3	3
6	10	10	10			7	9
5	8	9	5				
9	10	6	5				
6	6	4	8				

Sten Scores Factor G

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
3	3	6	6	3	5	5	7
7	8	4	2	7	6	2	3
5	5	6	2	1	2	4	4
1	4	6	2	4	4	5	5
3	4	3	6	2	3	2	4
4	7	6	4	1	4	4	3
7	6	4	4	4	6	6	4
4	5	7	2	3	2	2	2
4	5	5	2	6	6	4	5
3	3	3	1	4	1	1	1
1	5	7	6	2	1	5	6
6	4	6	7	5	6	2	3
3	6	7	3	6	5	5	5
2	7	3	2	1	4	1	4
2	2	4	5			4	1
1	4	7	4				
4	3	2	5				
3	9	4	1				

Sten Scores Factor H

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
4	5	8	8	1	2	4	5
3	5	5	5	5	4	3	4
1	4	5	4	3	4	2	5
7	5	1	2	4	4	2	2
7	8	3	3	2	5	2	4
4	7	5	3	8	6	7	6
4	5	3	4	5	5	6	7
2	1	8	2	4	6	3	3
7	7	2	4	4	5	4	4
2	5	5	2	7	6	8	8
5	7	3	3	5	4	4	6
5	7	6	8	2	3	4	5
5	8	2	3	8	7	6	8
3	3	5	2	5	5	1	2
4	6	7	8			2	2
2	3	7	8				
10	8	2	5				
5	8	5	4				

Sten Scores Factor I

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
4	4	1	4	5	6	5	3
6	2	5	7	4	4	4	3
4	4	10	6	4	5	6	6
7	6	10	8	4	3	4	5
7	6	4	2	8	3	4	5
7	6	4	6	4	4	5	5
6	6	6	4	4	4	5	9
4	3	5	4	8	7	6	4
6	4	5	6	7	4	6	4
10	4	5	3	6	4	5	7
4	4	7	6	4	4	6	4
5	2	4	2	8	9	3	4
6	4	5	8	3	4	2	2
5	4	7	6	6	9	6	5
7	2	5	10			8	7
6	2	6	3				
2	6	4	5				
8	8	6	2				

Sten Scores Factor L

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
6	6	4	4	6	9	8	5
7	6	7	5	4	4	8	4
7	8	1	6	5	6	9	9
7	6	5	7	5	7	3	2
5	8	7	7	8	8	8	8
6	1	7	6	4	6	8	8
5	3	7	4	10	10	2	2
9	7	6	8	9	9	10	8
3	5	8	9	5	5	7	3
6	6	9	8	4	6	6	7
7	2	4	3	6	8	2	2
3	7	8	9	8	8	4	6
9	3	5	8	4	4	4	4
5	6	8	8	4	6	7	7
9	6	7	9			9	10
7	9	6	6				
6	10	6	6				
5	7	5	3				

Sten Scores Factor M

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
8	6	4	4	6	4	7	6
10	5	5	4	4	4	6	6
9	6	7	10	5	5	6	4
5	9	7	10	6	7	4	4
8	9	7	4	9	8	4	4
6	9	6	5	7	8	9	9
7	9	5	4	9	7	7	6
10	10	4	4	8	10	7	7
4	6	6	7	9	9	4	4
9	6	6	8	6	6	4	6
4	7	7	7	5	8	9	9
6	6	6	6	10	6	10	7
5	6	4	10	4	4	4	4
6	9	8	7	8	4	8	8
7	8	4	2			6	9
7	7	5	4				
5	9	8	7				
8	8	3	1				

Sten Scores Factor N

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
6	4	3	7	4	3	7	6
3	4	3	5	4	3	5	3
6	3	3	8	5	6	3	3
3	4	4	2	4	7	4	5
1	7	7	4	6	3	7	10
7	6	6	8	9	7	9	4
9	8	5	3	7	7	7	8
4	4	4	4	2	9	6	4
9	10	3	3	4	6	5	3
7	7	2	3	9	7	7	10
6	5	3	4	4	7	4	8
4	4	5	7	7	6	5	4
3	7	3	7	5	4	6	5
3	1	4	7	5	7	2	4
3	6	3	3			7	7
6	4	1	6				
5	2	5	2				
7	8	3	8				

Sten Scores Factor O

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
6	5	6	3	10	9	7	7
5	6	8	6	6	5	6	4
5	7	8	7	6	6	9	9
8	4	4	7	7	6	5	6
8	3	8	8	8	7	8	7
7	4	6	7	5	5	2	5
6	3	10	8	10	6	3	4
10	10	6	6	9	7	8	8
7	4	10	9	6	7	7	7
5	2	5	6	7	4	3	4
8	2	5	8	8	9	3	3
6	4	9	7	7	6	8	9
9	1	6	7	5	5	5	5
9	5	10	9	8	5	7	3
2	4	6	8			10	5
9	7	4	4				
9	7	9	7				
6	4	8	4				

Sten Scores Factor Q_1

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
6	7	2	4	3	3	4	3
2	6	5	4	5	10	5	4
5	5	5	10	6	4	2	5
8	7	4	8	6	8	5	3
6	8	9	6	5	5	3	3
7	5	3	5	7	9	8	10
9	10	3	8	6	7	5	6
7	8	2	4	6	3	8	6
3	5	7	3	6	4	4	5
7	6	3	5	3	6	5	9
5	6	7	5	2	3	7	8
7	8	4	3	7	6	6	6
5	8	6	4	7	7	5	4
7	3	5	6	7	7	6	7
5	8	7	4			5	6
5	3	5	5				
4	6	4	7				
8	8	5	7				

Sten Scores Factor Q_2

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
7	7	3	2	6	5	5	4
8	4	1	3	7	4	8	4
4	5	7	3	6	6	7	5
3	7	8	8	4	5	3	3
1	5	8	6	5	3	3	9
5	4	5	4	3	7	7	7
7	5	1	4	8	8	4	4
4	5	5	5	5	4	5	5
10	7	7	3	3	8	3	5
7	5	6	3	4	5	7	6
5	8	3	3	5	3	5	5
4	4	5	5	3	4	5	3
6	3	7	6	6	7	7	5
5	6	3	3			6	5
9	2	6	5				
4	5	8	3				
7	3	4	5				

Sten Scores Factor Q_3

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
3	5	7	3	5	9	5	6
6	7	9	5	8	1	1	5
5	3	9	2	4	8	3	5
5	5	5	4	7	6	7	4
10	7	5	4	4	1	7	5
3	9	5	6	8	8	9	7
9	8	7	5	7	7	6	7
1	7	4	6	2	3	5	7
10	6	6	4	6	6	6	7
5	7	4	3	7	5	3	5
7	8	5	5	3	3	6	9
7	9	7	7	5	4	4	2
5	7	2	2	5	7	4	8
2	3	7	5	1	2	1	1
3	9	6	4			6	4
4	3	5	4				
3	5	5	9				
4	9	5	1				

Sten Scores Factor Q_4

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
7	5	5	4	9	8	6	6
4	3	5	5	5	3	6	7
8	7	5	6	5	5	8	7
8	6	6	5	7	6	5	5
5	2	8	6	7	6	6	7
4	1	7	6	3	6	3	5
3	4	5	6	10	10	3	5
10	6	10	9	10	10	8	7
3	2	4	10	5	7	4	5
2	3	6	6	7	6	8	4
5	4	9	6	10	10	4	5
5	5	5	8	8	10	8	9
6	2	7	10	4	4	5	8
6	7	7	5	8	8	8	3
3	5	6	5			10	10
7	8	5	6				
6	6	10	7				
7	4	7	7				

Raw Scores HFT

Groups							
I		II		III		IV	
pre	post	pre	post	pre	post	pre	post
15	32	14	15	6	7	0	0
10	19	14	17	0	6	1	1
3	23	3	6	0	0	4	15
22	29	6	5	3	7	19	20
10	1	16	22	8	4	0	4
13	29	16	18	3	17	8	15
9	23	20	21	1	3	9	12
26	32	19	24	8	12	5	8
18	25	16	14	6	3	7	13
28	32	32	32	9	11	7	4
16	14	2	4	17	21	13	15
29	32	6	6	23	6	15	27
12	16	12	14	13	9	20	15
6	10	8	10	9	5	10	19
3	7	0	1			18	18
12	15	3	0				
8	12	15	16				
23	29	9	12				

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