

A STUDY OF CERTAIN NON-COGNITIVE FACTORS AFFECTING  
READING ACHIEVEMENT IN EMOTIONALLY DISTURBED SCHOOL  
CHILDREN

Ph. D. Thesis (The University of Glasgow)  
NEIL M. BROWN M.A., M.Ed.  
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## S U M M A R Y

### (1) AIMS

Most authorities agree that school success is largely determined by intelligence. However such variables as personality characteristics and that tenuous area the emotional tone of the home are, among others, frequently examined in child guidance clinics on the well known supposition that they have an important bearing upon scholastic performance. The basic aim of this thesis was to study just how important such variables are. In this research the relationship between

- a) the parents' attitude towards the child,
- b) the child's Neuroticism and Extraversion,
- c) perinatal emotional maternal distress,
- d) emotional disturbance in one or both parents,

and the child's actual attainment in reading and arithmetic was examined; as was also the association between these variables and different levels of success and failure. These levels are known as levels of achievement and were based upon what the children ought to achieve as predicted from their Verbal I.Q. and C.A. Further, the contribution of each of these variables, as well as that of I.Q. and C.A., to the variance in attainment was analyzed. This area required research because although much work has been done with the variables individually, for the most part they have not often been combined; nor has much work been done in this area among Scottish school children as is evidenced in the suggestions for research made by several official reports.

### (2) SUBJECTS

These were boys and girls who attended a child guidance clinic in Glasgow principally for emotional therapy. They were divided into five groups:

- (1) Younger Boys: C.A. 7.5 to 9.4 years (M = 8.7, S.D. = .5)
- (2) Older Boys: C.A. 9.5 to 11.9 years (M = 10.5, S.D. = .8)

- (3) Younger Girls: C.A. 7.1 to 9.4 years ( $M = 8.4$ ,  $S.D. = .6$ )
- (4) Older Girls: C.A. 9.5 to 12.4 years ( $M = 11.2$ ,  $S.D. = .9$ )
- (5) Brain injured boys and girls: C.A. 6.5 to 12.0 years  
( $M = 8.9$ ,  $S.D. = 1.3$ )

The principal study concerned reading, and there was a subsidiary study of arithmetic in a reduced sample of the first four groups. A second subsidiary study concerned reading only in the Brain-injured Group. The numbers reported on in each group per subject were:

	<u>reading</u>	<u>arithmetic</u>
Younger Boys	74	44
Older Boys	60	42
Younger Girls	31	22
Older Girls	34	28
Brain-injured boys and girls	34	-

### (3) MEASUREMENT TECHNIQUES

The obtained reading and arithmetic ages, known throughout as ATTAINMENT scores, were calculated from the Schonell Word Reading Test R1 and a curtailed form of the Burt Four Rules Test. Levels of underachievement, normal achievement, and high achievement, known throughout as ACHIEVEMENT levels, were calculated from a regression equation in which Verbal I.Q. and C.A. were the predictor variables.

Hypotheses were formulated about the relationship between the variables involved and the attainment scores, and between the variables and levels of achievement of the subjects.

Altogether the following instruments were used

- (1) Schonell Word Reading Test R1,
- (2) Burt Four Rules Test (curtailed form),
- (3) W.I.S.C. Verbal I.Q.,
- (4) Junior Eysenck Personality Inventory,

- (5) The categorizations of parental attitudes made by a team of social workers,  
and (6) the categorizations of perinatal emotional maternal distress, and parental emotional disturbance, extrapolated from the case notes of psychiatrists and social workers.

In addition, the Bender Gestalt Test (Koppitz norms) was used to identify brain-injured children.

#### (4) MAJOR RESULTS

The results noted below are in the main confined to those related to the hypotheses stated. They are given in the following order

- A. each variable's relationship to attainment and to achievement in each of the four major groups;
- B. the same for the Brain-injured Group;
- C. the contributions of each variable to the attainment variance.

##### A. 1. Parental Attitude.

Positive correlations were found with reading attainment in all groups reaching significance only among the Younger Boys. Positive correlations were found with arithmetic attainment among Younger Boys (.05) and non-significantly, among Older Girls; the correlations among Older Boys and Younger Girls were negative and non-significant. Younger Boys and Younger Girls who were accepted achieved in reading. No significant association was found between Parental Attitude and arithmetic achievement.

##### A. 2. Neuroticism

High neuroticism in Younger Boys was correlated positively and significantly (.05 two-tailed) with reading attainment. All other correlations with both reading and arithmetic were non-significant. Younger Boys who were high neurotics achieved well in reading, as did

Younger Girls when underachievers were compared with high achievers. A reduced sample of high neurotic Older Boys tended to be underachievers in arithmetic. No further significant associations were found with either attainment or achievement.

A 3. Extraversion.

Extraversion was found to be associated with high attainment in reading among Younger Boys, and introversion with high attainment in reading among Older Boys (.02 two-tailed). No further significant correlations were found between Extraversion and attainment. Older Boys who were introverts achieved in reading (.02 two-tailed).

A 4. Perinatal and parental emotional stress.

No significant relationship was found between these variables and attainment or achievement.

B Brain-injured Group

This group differed from the others not only by its comprising brain-injured but also by comprising boys and girls, and younger and older children. Perinatal Emotional Maternal Distress was significantly associated with reading attainment (.05 two-tailed). No other variable was significantly associated with either attainment or achievement.

C Contributions to the variance.

Excepting the Brain-injured Group where an analysis of variance resulted in non-significance, I.Q. generally was the largest contributor to both reading and arithmetic attainment. This was followed by C.A. which, with the exception of reading among the Older Boys, was consistently the next best contributor. Neuroticism accounted for 12.3% of the variance among the Older Girls in reading and Extraversion for 12.4% among Younger Girls in arithmetic. Apart from this, these same variables and the others showed large variations in their contributions.

The above results are commented upon at length and related to the previous literature. Attention is drawn particularly to

- (1) the association between parental attitude and achievement;
  - (2) the association between high neuroticism and achievement in the younger children;
  - (3) the association between introversion and achievement among the Older Boys;
- and (4) the unusual results of this study when compared with those of other studies.

Inferences are drawn relevant to this population and, at times, the general school population, and various suggestions are offered for further research into this complex area.

PART ONE

CHAPTER 1

INTRODUCTION

THE ORIGINS, AIMS, AND SETTING OF  
THIS INVESTIGATION.

Since I.Q. tests were designed to predict general scholastic performance it is not surprising that there is a strong tendency that the higher one's intelligence, the higher will be one's scholastic performance. This is however only a tendency. "Intelligence is without doubt associated with high achievement in a very wide range of tasks and occupations. But even in those to which it is most directly relevant, it accounts for no more than about half the variation in performance, and in some situations and groups much less". (BUTCHER 1968 p.290). The correlation between school achievement and intelligence is of the order  $r = + .50$  (JENSEN 1973 p.92). All the variables combined together to determine school achievement can be regarded as totalling 100% of the achievement - the total variance. The percentage of the total variance when  $r = .5$  is  $.5^2 \times 100 = 25\%$  (see Chapter XIII for statistical procedures). Thus about 75% of whatever makes individuals differ in school attainment can be attributed to contributions of variables other than intelligence.

Much recent research has been devoted to identifying and measuring the part played by such other variables. Broadly they fall under the headings environment, motivation and emotion. BUTCHER (1968) and M.D. VERNON (1971) have summarized the following among others, as making relevant contributions:

- a) different conditions in different social classes e.g. physical deprivation and maternal care;
  - b) cultural differences e.g. different linguistic structures (BERNSTEIN 1961); and the way in which speech is employed (NEWSON AND NEWSON 1968);
  - c) the extent of education of the parents and the quality and quantity of books and magazines in the home (FRASER 1959), parents reading aloud to their children (DURKIN 1966);
  - d) the differing effects of home environment on motivation e.g. parental encouragement (FRASER 1959; DOUGLAS 1964), and parental demandingness (KENT AND DAVIS 1957);
- and
- e) a variety of different personality traits such as those traits identified by Cattell and Eysenck.

While teaching in Special Schools I had investigated in an M.Ed. thesis "Factors of Teaching Reading to Senior Mentally Handicapped Children" (Glasgow University, 1970) the possibility that environmental factors such as the relationship between the child and the teacher might play some part in the child's reading achievement. My interest in the non-cognitive factors which might influence school performance, and in particular reading, grew and an opportunity arose to study these while working as an educational psychologist at Notre Dame Child Guidance Clinic, Glasgow. This clinic with its teams of psychologist, psychiatrist, social worker and therapist affords an opportunity at present rare in Scotland to examine the relationship between parental attitudes and children's achievement, and between personality and achievement among disturbed school children -

an opportunity which is specifically sought in the S.E.D.'s Report "Ascertainment of Maladjusted Children"(1964), which is apparently being pressed for by the Educational Institute of Scotland (1972) and also by the National Research Project being discussed currently (December 1974) by the Scottish Colleges of Education.

The present study undertakes an examination of various factors described as being "in need of research" by the above Government Report. It examines the possible relationship between performance in reading and arithmetic and

- a) the accepting and rejecting attitudes of parents towards their children;
- b) the children's stability - neuroticism;
- c) the children's introversion - extraversion;
- d) perinatal maternal emotional distress;
- and e) parental emotional disturbance.

The subjects of the study are children who attend Notre Dame Child Guidance Clinic. This clinic was founded in the early Thirties for the assessment and treatment of emotionally disturbed children. Its rationale was then, as it is now, that it is insufficient merely to treat the child "in vacuo" - apart from his family environment, which environment may in fact be contributing largely to the child's disturbance.

Assessment is multidisciplinary - a situation not frequently met with in Scottish clinics but suggested as the optimum by the MACKENZIE REPORT (1969) and described by CHAZAN (1970) and more fully by STONE AND KOUPERNIK (1974). Here the four disciplines of psychology, psychiatry, social work and therapy meet. The pattern of assessment procedure is usually along the following lines:-

- (1) the child is seen on one or more occasions by the psychologist who examines intelligence, attainment and personality;
  - (2) the mother (preferably with the father) is seen a number of times by the social worker who probes into the family history and the manifest problem as it affects the family situation - at the same time laying the groundwork for treatment within the family situation;
  - (3) the child is observed by the therapist in a peer group situation;
- and (4) the psychiatrist interviews the parent(s) alone, the child alone, and the parent(s) and child together. He looks particularly at the psychopathology of personality and intra-family relationships.

The four workers then come together for an initial case conference under the aegis of the clinic's Director. There may or may not be specialists from other fields attending this conference e.g. the speech therapist, the child's teacher or head teacher, representatives of the relevant Local Authority Social Work Department, and other bodies. Information is pooled and discussed, a tentative prognosis is made, and treatment is outlined. This treatment can be at once both for the child and the parents.

Appendix I (p. A1 - A9)<sup>(1)</sup> contains a modified family case history which illustrates the type of information gathered in the clinic and how it is pooled by the different disciplines involved at the initial case conference. It should be noted however that the data used in this study regarding Parental Attitudes, Perinatal Emotional Maternal Distress, and Parental Emotional Disturbance are not taken simply from knowledge obtained at the time of this conference, but as will be explained later, (Chapter XI and XII), from much wider sources.

The subjects of the main study - on reading - are seven to twelve year old boys and girls who attend the clinic and who show no evidence of brain injury. Altogether some 258 children were examined of whom 199 fulfilled the criteria (q.v. Chapter VIII) for inclusion. Two subsidiary studies were also carried out - one examining arithmetic using the protocols of 136 of the main study children, the other, examining the relationship between the variables and reading among thirty-four brain - injured children.

The results and opinions of the various professional disciplines were pooled. Information regarding

- a) reading and arithmetic attainment, intelligence, and the children's personality comes from psychological examination;
- b) parental attitudes - from a team of social workers;

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(1) Throughout this thesis to make for easier reference whenever an Appendix is cited its page number will also be given. Pages in the Appendices run from unity and are prefixed by the letter A.

and c) perinatal emotional distress and parental emotional disturbance - from psychiatrists' and social workers' report.

Information regarding parental attitudes is at best tenuous - at times dubious. The team of five social workers - three of whom were psychiatric social workers, one a family case worker, and one a former probation officer - was specially primed by the writer and tested for inter-judge reliability.

Data was collected over a period of forty months. Three major statistical techniques were used:-

- (1) Correlation - to determine the degree of association between the variables and actual attainment in reading and arithmetic.
- (2) Zone analysis using chi-square and Fisher tests - to determine the degree of association between the variables and different levels of achievement and under-achievement.
- (3) Multivariate regression analysis - to predict reading and arithmetic ages; and to determine the individual contribution to the variance of each variable.

PART TWO

REVIEW OF THE LITERATURE

CHAPTER 11

OVERVIEW OF FACTORS ASSOCIATED WITH READING  
DISABILITY.

The purpose of this section is to stress the multiplicity of variables other than those directly dealt with in this study, which may be associated with reading disability - it is brief, not extensive, and merely touches upon points of view.

The factors associated with reading disability may be summarized under the following headings: -

- |                             |                                |
|-----------------------------|--------------------------------|
| 1) <u>PHYSICAL</u>          | a) visual defect,              |
|                             | b) auditory defect,            |
|                             | c) dominance confusion,        |
| and                         | d) endocrine dysfunction.      |
| 2) <u>EMOTIONAL</u>         |                                |
| and 3) <u>ENVIRONMENTAL</u> | a) social background           |
|                             | and b) educational background. |

I PHYSICAL FACTORS.

a) Visual defect

There are three points of view concerning visual defect as a factor in reading disability:-

- (i) That held by MONROE (1932)<sup>(1)</sup> and GATES<sup>(1)</sup> (1935) - visual difficulties e.g. poor discrimination and lack of a clear orientation, are causal defects.

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(1) Cited in FERNALD (1943) p. 166.

- (2) The middle ground, that some will learn in spite of such defects. This view finds its proponents among such workers as EAMES (1938) and GRAY et al (1937)
- (3) FERNALD (1943 p. 177) is typical of the third opinion, that poor eye co-ordination is the result rather than the cause of reading disability.

b) Auditory defect.

TANSLEY and GULLIFORD (1960 p.120) appear to have summed up the situation when they say "hearing can be quite adequate and the child may still be poor at discriminating sounds".

GATES (1935)<sup>(2)</sup> and VERNON (1957) agree that

- a) poor discrimination of speech sounds,
- b) lack of auditory acuity due to partial deafness,
- and c) auditory memory span

are causal factors in reading disability. However, KENNEDY (1942) using audiometric techniques, and ROBINSON (1955) studying retarded readers, report no significant correlation between auditory defect and reading disability.

c) Dominance confusion

ZANGWILL (1960) appears to sum up the present state of research in this area. He admits that many crossed laterals learn to read without difficulty, and therefore concluded that while incomplete cerebral dominance may well be a genuine correlate of reading disability it is not a causative factor.

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(2) Quoted in FERNALD (1943) p.323.

Studies supporting incomplete dominance as causing confusion are ORTON (1928),<sup>(3)</sup> SELZER (1933),<sup>(4)</sup> MONROE (1932), and HOPKINS (1968). The latter summarises his study of the literature by saying that the majority of writers report an increased incidence of left handedness or ambidexterity or mixed dominance in reading failures. The following disagree:- SCHONELL(1942), FERNALD (1943), VERNON (1957), BECK (1960), EISENSEN (1966) DE HIRSCH (1966) and DOUGLAS et al (1967).

e) Endocrine dysfunction

MATEER (1935) analysed one hundred children with pituitary dysfunction who were old enough to have reading experience. She showed that no matter how high the patient's I.Q. he is relatively poor in reading. OLSON (1940) said that changes in emotional attitudes, physiological immaturity, mental retardation, speech defects, eye disturbance, motor inco-ordination and reversal tendencies can be caused by pituitary dysfunction.

11 EMOTIONAL DIFFICULTIES

MORROW (1969) reviewing the literature on emotional difficulties suggested that "emotional and personality difficulties may be interpreted variously as a) the cause of reading difficulties, b) the result of reading difficulties or, noncomitally, c) the concomitants of reading difficulty...the research...does not really produce exclusive answers, but suggests many areas requiring closer definitions."

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(3) Quoted in Fernald 1943 pp. 158 - 159.

(4) Quoted in Schonell 1942 p. 173

GATES (1941) found that 19% of his reading disability cases were beyond doubt caused by emotional difficulties. FERNALD (1943) says that emotional instability may be a cause of reading disability, but stresses that this is "provided that some situation not connected with reading is responsible for the emotion, so that the child comes to his early reading attempts with the emotional attitude already established" (p.176). She continues however that on the other hand children who have no negative emotional attitudes may develop such attitudes as a result of a failure to learn. BLANCHARD (1928), too, states that emotional and personality dysfunctions are caused by reading disability. DOLCH (1931) asserts that it is possible that a child who is frustrated in other learning situations may be conditioned against reading... "many children hate the reading lesson simply because it compels them to exhibit before their companions their ignorance or lack of skill". KIRK (1934) demonstrated that inattentiveness, shyness, negativism, incorrigibility, and daydreaming improved in mentally handicapped children who had been given remedial treatment in reading.

SPACHE (1957), exploring the reactions of fifty retarded readers by using the Rosenzweig P.F., reported their responses fell into five patterns - (1) an aggressive or hostile group in conflict with authority; (2) an adjustive group seeking only to be inoffensive; (3) a defensive group - sensitive and resentful; (4) an autistic group characterised by blockage or withdrawal; and (5) a peace making or solution seeking group.

RUTTER et al (1970) reported that a high proportion of those Isle of Wight nine to twelve year olds with significant reading difficulty - twenty eight months behind C.A. - had marked emotional and behavioural disorders judged by very stringent psychiatric standards, (p.106). DAVIE et al (1972)<sup>(5)</sup> using a less stringent criterion of reading difficulty, reported 37% of their backward readers were maladjusted, and a further 35% were unsettled.

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(5) Cited Wall 1973.

### 111 ENVIRONMENTAL FACTORS.

#### a) Social background

Many studies have concluded that environment is a factor in reading disability. Among such studies are those of MONROE and BACKUS (1937), DEUTSCH (1960), and the PLOWDEN REPORT (1967). BERNSTEIN (1961) tends towards this position.

MORRIS (1966) concludes in her intensive study, that although children's reading standards are linked with home circumstances, unpropitious home circumstances do not inevitably prevent a child from becoming a good reader if he is fortunate in his personality and if the school conditions are favourable. PIDGEON (1970) reiterated this, saying that adverse environmental factors reduced a predicted level of reading but he added that the mechanisms were poorly understood. Factors such as low social class and poor material circumstances may be of much less importance than <sup>(low)</sup>poor emotional stability and interest by parents. DAVIE (1970) suggested that social classes concealed a genetic not simply a cultural factor. GOODACRE (1970) pointed out that social classes per se were not discrete entities but simply categorization groups which probably concealed more than they revealed. She also argued that the parents' motivation was of great importance in the child's achievement. That parental interest in school work led to higher performances was noted by PIDGEON (1970). BURT (1969) and CRITCHLEY (1970) have suggested that it is this parental interest, rather than social class or economic circumstances that is the single most important factor in home environment.

b) Educational factors

(1) Intellectual Maturity.

Because there is a high correlation between reading and intelligence (see Chapter IX) there has been much research into whether or not a minimum mental age is necessary for successful reading.

Older writers such as MONROE (1932) and DUNCAN (1953) claimed that to teach reading before a mental age of about 6.5 years had been attained was to open the door to reading disability. MORPHETT and WASHBURNE (1931) concluded: "Consequently it seems safe to state that by postponing the teaching of reading until children reach a mental age of six and a half years, teachers can generally decrease the chances of failure and discouragement and can correspondingly increase their efficiency".<sup>(6)</sup>

However the concept of a minimum mental age has been criticized by other writers. Most British children begin to learn to read before the age of six. THACKRAY (1971 p.17) points out that numbers of researchers including himself (1964) have provided evidence of pre school children learning to read between three and five years; and that DOMAN (1965) and MORRIS (1963) have shown the same for children below three years. He concludes by saying that some modern writers on this question of a minimum mental age "... agree that the different methods and materials used in the teaching of reading, and the differing skills of teachers, make it impossible to state firmly that a certain minimum mental age is required for success". The BULLOCK REPORT (1975) appears to summarize the position when it suggests(p.75) "... the early stages of reading consist of various kinds of learning experience and that there is no one point to which the term 'reading readiness' can reasonably be applied."

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(6) Quoted in THACKRAY 1971 p.16

SCHONELL (1942) showed that with increasing age backward readers become less prone to reverse letters and transpose letters or words. The tendency to reversals, says Orton, is probably due to delayed cerebral development. RUTTER (1970 p.53) found a significant difference in nine to twelve year olds between mean W.I.S.C. verbal scores for control and retarded reading groups.

Of 398 children examined by MALMQVIST (1960), the poor readers had a significantly lower I.Q., but she concluded prediction by I.Q. alone was not better than a battery of reading tests. DE HIRSCH (1966) criticized using I.Q. for prediction of backward readers, as reading difficulties occur at virtually all I.Q. levels and I.Q. represents only a global and not a differentiated evaluation of the child's performance. (Prediction of reading age is discussed in Chapter IX).

b) Educational factors cont'd

(2) Classroom environment and teaching methods.

Fernald, Gates, Monroe, Morris and Pidgeon, and almost all who have commented, have agreed that reading ability is not helped where the classroom climate is poor.

DUNCAN (1953 pp. 17-18) lists as factors leading to reading disability: attempts to teach something to a child at too early an age; something remote from the child's experience; an over-analytic approach apportioning "bits" for the child to do; unwise drilling of meaningless material; and over specialization in subject teaching. He goes on to say that frequent changes of school and irregular attendance lead to reading disability. MORRIS (1966) and GODDARD (1969) noticed that irregular attendance affected reading in the junior school but not in the infant school. MALMQVIST (1960), however, found no relationship regardless of age.

From this brief summary it can be seen that many factors have been put forward as causes of reading disability and that there is still much controversy in the field. Probably underachievement in reading is a function of an amalgam of some or all of these and other factors. The present study may be regarded as a perusal of several of such factors.

CHAPTER 111

THE EFFECTS OF PARENTAL ATTITUDES ON CHILDREN'S  
PERSONALITY AND SCHOOL PERFORMANCE

"Parent - child relationships... are fundamental to the pupil's whole development, and in particular to his ability to apply himself in school... It is vital to know whether there is adequate security and love, whether the child is reared in an atmosphere of relative calm and understanding, or whether he is the centre of tension and consequent anxiety." So wrote WALL (1962) in his U.N.E.S.C.O. report (pp. 34-35). In 1970, MCPHERSON supported the view that there are consistent relationships between different patterns of family behaviour and children's symptoms. Radke stated, however, that although there was no room to doubt that some variations of personality were related to parental attitude variations, nevertheless the precise nature of the interactions involved was complex. Part of the difficulty, she said, was due to the fact that researchers had been content with "unanalysed, generalized, and stereotyped descriptions of the home. The result is a seemingly hopeless confusion of generalization in the reported findings". (RADKE 1946).

The variety of words used in such descriptions has vied in number, if not in etymology, with those used in the description of reading backwardness - accepting, authoritarian, cold, demanding, democratic, dominant, inconsistent, indulgent, normal, overprotecting, permissive, rejecting - these are but a sample.

A further complication arises in that different researchers may give different nuances of meaning to the same epithet; thus what is permissive behaviour for one may be indulgent for another, what is demanding for one may be dominating for another. In reviewing such literature, confusion and reduplication could be avoided if it were possible to, as it were, cut a swath through what amounts to a descriptive jungle, and while not losing the essence of the parental attitude cut epithet to a minimum.

NURSE (1964) found that there were two clusters of parental attitudes which formed the "syndromes" Accepting - Rejecting. GARRISON et al (1968 p.324) summarized this:- "Some of the conditions often cited as favouring acceptable behaviour patterns and optimal social adjustments are democratic homes, permissiveness, affectionate parents, warm and close parent - child relationships, tolerance, understanding - all of which could be put under the inclusive heading of 'Acceptance'. A list of conditions that characteristically produce unfavourable parent-child relationships and poor social adjustments usually includes authoritarian homes, possessiveness, over-protection, overindulgence, indifference, inconsistent or severe discipline, dominating parents, lack of affectional relationships, high parental expectations, neglect - which could be summed up in the word 'Rejection' denoting either the intention or the effect of parental behaviour".

Accordingly the literature here will be reviewed from the standpoint of Acceptance and Rejection. It will be subdivided into two main areas - the effect of parental Acceptance and Rejection on :-

- (a) the personality and behaviour of the child,
- and (b) the child's achievement.

(a) The effects of parental Acceptance and Rejection on the child's behaviour.

SYMONDS (1939)<sup>(1)</sup> reported that whereas accepted children usually display desirable social characteristics, rejected children display attention seeking, feel persecuted, and are more aggressive, hostile, hyperactive, or rebellious. These latter children, too, whose parents are dominating, although they are polite and reliable, tend to be more submissive and dependent. Maladjustment, withdrawal, and unhappiness, says BURT (1944), are common results of lack of affection and security in the home.

ANDERSON (1940) found that children who saw their parents as critical, nagging, or extremely lenient in supervision were rated by classmates as aggressive, rebellious and "show - off", while those who saw their parents as having low dominance were considered co-operative, stable, and cheerful.

RADKE (1946) reported that in homes where there are warmth and affection, the child's behaviour will be socially acceptable, and he will face the future confidently. Where the parents interest themselves in the child's leisure pursuits, he develops self-reliance and feelings of security. Rejection and dominating behaviour in the parent, on the other hand, she associated with submission, aggression, insecurity, nervousness, non-compliance, self consciousness, uncooperativeness and disinterest on the part of the child.

TREUDLEY (1946) describing the effects on children of psychiatric illness in the parents manifesting itself in an authoritarian egocentrism towards the children concluded that in conditions where the daughter was kept at home as company for the ill parent,

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(1) Cited in BOSSARD and BOLL (1966) p. 292.

such girls withdrew from society; but boys reacted by minor delinquencies and running away from home. In both cases the results of such a regimen were anti-social. HEWITT and JENKINS (1946) after examining the records of 309 children at the Michigan Child Guidance Institute concluded that there was a connexion (which they assumed to be causal) between parental rejection and "unsocialized aggressive behaviour" which they defined as the defiant aggression of children denying the rights of others as manifested in such presentations as violence, cruelty, starting a fight, open defiance of authority, and inadequate feelings of guilt. LEWIS (1954) using Hewitt and Jenkins' classification also found that rejection by parents was significantly related to unsocialized aggression in children.

KENT and DAVIS (1957) working on the hypothesis that individual differences in intellectual development, as measured by I.Q. tests, are related in some degree to parental attitudes, investigated three groups of children and their home background. They showed that two-thirds of their children from demanding homes displayed signs of emotional disturbance - tending to be restless, tense, ill at ease, and overanxious to please.

In the eight reports reviewed thus far there is considerable agreement that there is a positive correlation between the generally accepting attitudes of parents and socially acceptable personality and behaviour patterns in the children, and between the generally rejecting attitudes of parents and socially unacceptable personality and behaviour patterns in the children.

Since both Nurse and Garrison - as do BOSSARD and Boll (1966) - take maternal overprotection as part of the rejection "syndrome", and since RUTTER et al (1970 p. 261) suggest such overprotection may lead to neurotic tendencies among the children, the writer examined a number of studies which in their design separated 'overprotection' specifically from the more generalized 'rejection', with the intention of finding whether or not overprotection does in fact lead to the above conclusion.

LEVY (1943) studied twenty cases drawn from the records of a child guidance clinic. "Pure" overprotection he describes as manifesting itself in four ways - excessive contact, infantilization, the prevention of independent behaviour, and maternal control which he subdivided into either "indulgent" or "dominating". He found that such pampering or dominating the child's every activity is an inadequate preparation both for social life and for his accepting disappointments and frustrations.

Radke's description of the overprotected child was couched in similar terms to her description of the openly rejected, and dominated, child - he is infantile, submissive, insecure, aggressive, jealous and nervous. Hewitt and Jenkins made a similar report - he is incapable of showing satisfactory emotional responses - shy, apathetic, worrying, sensitive, submissive. Again similar terms were used by Kent and Davis to describe over two thirds of the children of their "over-anxious" parents - timid, lacking in confidence, restless, anxious, and in continual need of adult attention.

GARRISON (1968)<sup>(2)</sup> quotes REICHARD and TILLMAN (1950) as suggesting that when "parental rejection or overprotection is severe, it may account for the development of schizophrenia," and LO(1969), in a comparison of forty nine neurotic children with controls, found that overprotection was a significant factor in childhood neurosis.

Thus overprotection on the part of the parent appears to be associated with similar unacceptable social behaviour and personality patterns in the children as is the rejecting attitude of the parent.

(b) The effects of parental Acceptance and Rejection on the child's school performance.

The effects on the child's achievement of accepting and rejecting parental attitudes appear to be cognate with those on personality and behaviour in that the Rejection syndrome tends to be associated with underachievement and the Accepting syndrome with achievement. The review in this area will include not only the general syndrome of Acceptance - Rejection with its attendant democratic - overprotection atmospheres as mentioned in discussing behaviour and personality but also the effects of punishment.

In a comparative study of the home backgrounds of forty underachievers and forty overachievers KURTZ and SWENSON (1951) found that pride, confidence, affection and interest on the part of the parents were in greater evidence for overachievers than for the underachievers. HAGGARD (1957) in a study of bright high and low achievers in arithmetic concluded the best way to produce high achievers is to help the children develop into anxiety free, emotionally healthy individuals trained to master a variety of intellectual tasks.

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(2) Quoted in Garrison 1968 p. 328 footnote.

DAVIDSON (1961) studied school phobia as a manifestation of family disturbance. Thirty children attending a child guidance clinic were examined. He found that the return of the children to a school was impeded by the mothers "continually harping on failure". DE HAAN and HAVIGHURST (1961) in a survey of the literature stressed the emotional inadequacies of underachievers and their poor personal adjustment compared with those of achievers.

The democratic tone of the home appears also to play a significant role. BALDWIN et al (1945) in a description of democratic parents said they seemed to surround their children with an atmosphere of "freedom, emotional rapport, and intellectual stimulation" which served to accelerate the child's intellectual development. They found the children of democratic parents, when compared with those whose parents were casual, indulgent, or rejecting, showed much the greatest increase in I.Q., and they were significantly high on such variables as originality, playfulness, patience, curiosity and fancifulness. They concluded that not only do such children have the intelligence but also they have the "creativity and imagination to put it to use".

Low achievers studied by WALSH (1956)<sup>(3)</sup> reported that they were criticized and isolated by their families, and were unable to express themselves freely and adequately. PEPPIN (1963) reported that the parents of high achievers were less critical of, and more in rapport with their children.

GETZELS and JACKSON (1962) divided high I.Q. children from a private school into two groups - high I.Q. with lower creativity, and high creativity with lower I.Q. Both groups were examined as students, as individuals, and as members of family groups.

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(3) Cited in GARRISON et al (1968) p. 270

The authors found that the high creativity group were overachievers, and having attributed .5 as the correlation between I.Q. and learning, as did Cattell (1965 p. 166), they asked if part of the unexplained variance may not be attributable to cognitive functions of the creativity type. They then suggested that patterns of child rearing play a part in the growth of creativity, i.e. they suggested that high achievement might be attributable in part to child rearing. The mothers of their high creatives worried less about cleanliness, good manners and studiousness, were more interested in the child's openness to experience and enthusiasm for life, and were less rigid in their child rearing. DE HAAN and HAVIGHURST (1961) reported findings suggestive of this last when they found authoritarian personalities were liable to be anxious, insecure, and rigid, and while they did well in mechanical tasks, they did poorly in flexible, creative thinking.

It appears that the specifically overprotective parent plays a deleterious part in the child's achieving. HATTWICK and STOWELL (1936) found a positive correlation between underachievement and "parental oversolicitousness". SPERRY et al (1958) reviewing the case histories of seven underachieving boys, found their mothers to be overprotective. HALL (1966) in a comparative study of twenty underachieving boys and twenty matched controls, interviewed both parents separately, but simultaneously, in their own homes. Here again mothers of the under achievers were more overprotective and displayed more child rearing anxiety than did the mothers of the control group.

D'HEURLE et al (1959), on the other hand, in a study of the personality, intellectual, and achievement patterns of seventy six gifted children, found small positive correlation between parental overprotectiveness and arithmetic, reading, and general achievement scores. Parental overprotection in this study, however, was associated with parental pressure for achievement. Nevertheless although this appears to introduce a new variable CHANCE (1961) in a discussion of the interplay between pressures for achievement and overprotection, suggested that the mother's attitudes towards early independence training will differentially influence the child and his subsequent school achievement as a function of her interpersonal relationship with him.

Punishment and reward may be reflections of rejecting and accepting attitudes. CONKLIN (1940) reported that underachieving primary school pupils had experienced severe and frequent punishment. DREWS and TEAHAN (1965) cite GREENACRE'S (1949) argument that the frustrations engendered by parental restraints may impair intellectual efficiency because of the increase in sado-masochism and the resulting anxiety in the child.

ROSEN and D'ANDRADE (1959) in a laboratory study compared twenty boys with high need for achievement with twenty boys with low need for achievement. They concluded that the parents of the high need for achievement boy "...on average tend to put out more affective acts... As he progresses they tend to react to his performance with warmth and approval" that is, they psychologically reward the child. HALL (1966) described the mothers of her underachievers as being more severe regarding punishment and aggression than were the mothers of the controls, the fathers in turn reflected more hostility.

LYTTON (1968) examining the intellectual functioning, personality, and home background of two contrasted groups of eight good and eight poor achievers (boys) matched for age and I.Q., reported his poor achievers were marked, to some extent, by a more adverse parent - child relationship the which he had defined as the sum of ratings on "harmony in the home", "acceptance of the child", "permissiveness", "punishment", and "protectiveness" which he derived from work by the Fels Institute.

However FREEBERG and PAYNE (1967) cite BIGLIN (1964) as having had little success in relating parents' attitudes to academic achievement when intellectual ability and socio-economic status were controlled.

The evidence outlined above suggests strongly that variations in parental attitudes are associated with variations both in the personality and behaviour, and in the achievement, of children. (DOLLAR (1972) suggests similarly that variations in teacher - pupil interaction result in different variations in pupil behaviour and achievement.) It appears that parents who portray those attributes termed accepting here tend mainly to have children whose behaviour and personality are socially acceptable and are achievers, and vice versa for parents displaying rejecting attributes.

CHAPTER IV

THE PERSONALITY THEORY OF H.J. EYSENCK.

Most commentators agree that the personality of the child is of importance to his achievement. Several approaches to the measurement of personality have been made. These may be described as ranging through four broad techniques. Firstly, there is the ad hoc personality assessment each of us is constantly making in everyday situations. Very little psychological technique is involved. Secondly there are such situational assessments as made by Hartshorne and May, and the War Office Selection Boards. Here objective, quantitative, scores are applied to behaviour in 'normal' social situations devised for this purpose. Thirdly there are projective techniques in which a procedure is involved whereby an individual 'projects' his characteristic modes of behaviour in a relatively unstructured, ambiguous situation. Fourthly there is the dimensional approach. "The term 'atomistic' has also been applied to this approach. Interest centres on the placement of individuals on continua measuring definable traits. Different writers show considerable divergence in respect of the nature and number of the traits or dimensions they distinguish, much in the way in which controversy used to proceed regarding the number of primary instincts. Conclusions have to a considerable extent been reached on the basis of factor analysis..." (SEMEONOFF 1966 pp. 10-11).

Thus the assessment of personality ranges from what may be termed an "all-round-feel" to the much more precise. Eysenck is a proponent of this last approach.

In his foreword to Eysenck's "The Biological Basis of Personality", NEWTON KUGELMASS (1967) describes Eysenck as "a formidable opponent of projective methods of personality study but a rigorous exponent of the scientific study of personality. Thus by psychometric studies of individual differences and by factor analysis he evolves basic dimensions of personality, rational methods of measurement, and the relationship between these dimensions and susceptibility to conditioning..." (pp. ix - x). The principle dimensions Eysenck postulates are Neuroticism<sup>(1)</sup> (or anxiety or emotionality) and Introversion - Extraversion. He established (1952) a third dimension - Psychoticism - this has not been fully developed, nor is it of interest here. These factors are orthogonal to each other and to intelligence.

The identification and description of these dimensions are not enough. He writes (1967) that it is necessary to take some such personality dimension as Stability - Neuroticism, conceptualize it in terms of some variable in the experimental field and then carry out experiments on whether this identification is feasible and fruitful. That is, it is necessary firstly to make use of a descriptive approach to isolate the main dimensions of personality; and secondly, to use the hypothetico - deductive approach in which the dimensions are tentatively identified with concepts, deductions are made from this identification and experiments are carried out to test the value of these deductions. He maintains it is necessary to try to link up personality dimensions with the main body of experimental and theoretical psychology and he illustrates the paucity of this linkup by citing the attempts by educational psychologists to determine whether praise or blame motivates children better, while THOMPSON and HUNNICUTT (1944), (as also RIM 1965, and KENNEDY and WILLCOTT 1964),

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(1) Throughout, the variables Neuroticism and Extraversion are denoted by the use of the capital letter; small initial letters refer to the position along the continuum of each variable.

had already shown that praise and blame have different motivational effects on extraverted and introverted children.

The two factor pattern of Stability - Neuroticism and Introversion - Extraversion goes back according to EYSENCK (1964b) seventeen hundred years to the Greek philosopher Galen (Its prototype however can be found even earlier in the speech of ERYXIMACHUS "The Good Doctor...must be able to bring elements in the body which are most hostile to one another into mutual affection and love; such hostile elements are the opposites hot and cold, wet and dry, and the like; it was by knowing how to create love and harmony between these that our forefather Asclepius as our poets here say and as I believe, founded our craft" (PLATO - Symposium); and can be traced back even further to Alcmaeon of Croton, a disciple of Pythagoras.) Galen categorized people into four temperaments according to the four humours; a person was one or other of these, never a combination. Kant followed this typology, and Wundt posited the existence of a dimension, or continuum, describing the melancholic and choleric temperaments as being associated with strong emotional reactions, and the phlegmatic and sanguine as being associated with weak emotional reactions. The choleric and sanguines tended to have rather changeable emotions and the other two tended to have emotions which were rather firm and stable. Consequently, he posited the existence of another dimension or continuum - "changeable - unchangeable". Both these axes have been renamed and today we know them as the more familiar Extraversion - Introversion and Stability - Neuroticism axes.

Jung had posited two major attitudes of the personality - extraversion - the person's orientation to the external world; and introversion - his orientation to the inner, subjective world. Jung related both these attitudes to each of the four fundamental psychological functions - thinking, feeling, sensing, and intuiting. All functions are present in the person in differing degrees - the most dominant known as the "superior" function, and the least dominant known as the "inferior" function which is repressed into the unconscious. Eysenck's approach however is concerned entirely with the overt, conscious and behavioural aspects of personality and he writes "It would, therefore be quite incorrect to imagine that what we have to say has very much to do with Jung and his particular system; insofar as the typology discussed here has a historical background, it may be traced back to Galen, Kant, and Wundt, rather than to Jung" (Eysenck 1964b pp. 49-50).

As Vernon (1961) has posited a hierarchical structure in the structure of human abilities, so EYSENCK has posited a hierarchical structure in the organization of personality. There are four levels of his Gagne type behaviour organization. (Gagne 1965). At the lowest of these there are specific responses, such as responses to experimental tests which are observed once, and may not be characteristic of the individual. At the second level there are habitual responses which tend to recur under similar circumstances. At the third level habitual acts are organized into traits - sociability, impulsiveness, excitability - which are theoretical constructs and are based on the observed intercorrelations of a number of different habitual responses i.e. they are group factors. At the fourth level these traits are organized by observed correlations between the various traits into the personality types. Although concepts at the trait level may be very useful, under

certain circumstances they are not independent but quite highly correlated and "a system of description purely on correlated traits leaves out what may be the most important variable of all, namely that which underlies these correlations and gives rise to the higher-order type - level concepts of Extraversion and emotionality". (EYSENCK 1957). It has also been found that concepts like Extraversion - Introversion and Neuroticism - Stability are easily replicable (EYSENCK & EYSENCK 1969). EYSENCK (1967 p. 40) states "the picture that emerges ... is a fairly clear and concise one. At the highest and most inclusive level of personality description, we are apparently dealing with two main dimensions, the one ranging from high degrees of emotionality to very low emotional reactivity, the other ranging from high degrees of introversion to high degrees of extraversion. Both of these scales are continuous, and the majority of people have been found to give scores intermediate between the extremes; very high scores in either direction are relatively rare".

EYSENCK and RACHMAN (1965) give a brief descriptive account of the extravert and the introvert derived from factorial studies. These descriptions are, as it were, of "perfect" extraverts and "perfect" introverts; few people in fact closely resemble these extremes, and most are somewhere in the middle - ambiverts - but "this does not necessarily detract from the importance of these typological concepts, just as little as the fact that fifty per cent of the total population have I.Q.'s of between 90 and 110 detracts from the importance of intelligence as a concept in psychology". The typical extravert is "sociable, likes parties, has many friends, needs to have people to talk to, and does not like reading or studying by himself. He craves excitement, takes chances, often sticks his neck out, acts on the spur of the moment, and is generally an impulsive individual. He is fond of practical jokes, always has a ready answer, and generally likes change; he is carefree, easygoing, optimistic and likes to laugh

and be merry. He prefers to keep moving and doing things, tends to be aggressive, and loses his temper quickly; altogether his feelings are not kept under tight control, and he is not always a reliable person".

"The typical introvert is a quiet retiring sort of person, introspective, fond of books rather than people, he is reserved and distant except to intimate friends. He tends to plan ahead, 'looks before he leaps', and mistrusts the impulse of the moment. He does not like excitement, takes matters of everyday life with proper seriousness, and likes a well ordered mode of life. He keeps his feelings under close control, seldom behaves in an aggressive manner, and does not lose his temper easily. He is reliable, somewhat pessimistic and places great value on ethical standards".

Describing the dimension of Stability - Neuroticism they write that the neurotic has emotions which are labile, strong, and easily aroused; he is moody, touchy, anxious, restless, and so forth. He who is stable is less easily aroused, calm, even-tempered, carefree, and reliable.

JONES (1960) states that "In learning theory terms on individual scoring high on the factor of N would be characterized by a high level of drive in avoidance situations". This high level of drive must, Eysenck points out, be considered in relation to the Yerkes - Dodson "Law" at times known as the "inverted u hypothesis", which asserts that the relationships between drive and performance is curvilinear, with an optimum somewhere near the middle of the range such that as drive increases so does performance until the optimum has been passed. From this point any increase in drive, or motivation will produce a decrement in performance. This "law" further asserts that the optimum for any given task depends on the complexity of the task; the more complex and difficult the task the lower the optimum motivation, whereas the simpler and more straightforward the task

the higher the optimum motivation for that particular task (YERKES and DODSON 1908)<sup>(2)</sup>.

Eysenck instances several reasons why this should be so. These are to be found in the work of (i) the Iowa Group - Farber, Taylor, and Spence, and (ii) the Yale Group - Mandler and Sarason.

(i) The Iowa Group. Making use of the Hullian concept of excitatory potential as a multiplicative function of habit and drive strengths TAYLOR (1956) and her associates predicted that highly anxious individuals would be more susceptible to conditioning because of the effect of the higher drive. They hypothesized that high drive level would facilitate the learning of complex tasks. In classical conditioning where only one type of response is evoked an increase in drive increases performance. However in the case of complex learning where many responses other than a correct one are possible, and where the correct response would not be the most likely one - if it were there would be little to learn - anxiety as a drive energizes all the habits that are evoked in a situation, incorrect as well as correct. In such a situation where a correct response based on a relatively weak habit strength has to compete with stronger tendencies to respond incorrectly, high anxiety, by multiplying the strength of both tendencies, is deleterious to the correct response.

(ii) The Yale Group. MANDLER and SARASON (1952) hypothesized that the stimulus aspects of the test situation are (a) task drives i.e. "drives which evoke responses relative to satisfying the requirements set by the task or experimenter", or (b) the anxiety drive which is a "function of anxiety reactions previously learned as responses to stimuli present in the testing

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(2) Cited LEVITT 1968 pp. 144-148.

situation - anxiety reactions are generalized from previous experiences to test situations. The anxiety drive ... primarily elicits responses that tend to reduce the drive". Between these two drive components and the final responses are three intervening responses

- (1) from task drive,
- (ii) from anxiety drive and relevant to the task in hand,
- and (iii) from anxiety drive but not relevant to the task in hand.

There are two types of final responses - task responses and anxiety responses. Such anxiety responses are self rather than task centred and manifest themselves as heightened somatic reactions, feelings of inadequacy or helplessness, loss of status, and implicit attempts at leaving the test situation.

Mandler and Sarason deal with the differential effects of anxiety not as a function of the task characteristics but as a function of the subject characteristics. They deal essentially with task relevant and task irrelevant drives. Thus as Eysenck (1967 p.42) puts it "A heightened drive state is linked with a number of previously learned response tendencies, frequently emotional in nature and irrelevant to the task in hand; these response tendencies disrupt performance by competing with the correct response". Performance, apparently, is interfered with primarily because test situations contain many clues which inform the subject he is in a state of danger, and thus the anxiety 'blinkers' the subject into regarding internal events rather than concentrating on external stimuli essential to the correct performance of the task.

Thus both Taylor and her associates of the Iowa school, and Sarason and Mandler of the Yale school, amongst others, according to Eysenck, afford theoretical evidence for the curvilinear relationships between the Stability - Neuroticism continuum and performance as posited by the Yerkes - Dodson "Law".

In his attempt to explain the complex interaction between anxiety and attainment, EASTERBROOK (1959) puts forward the concept of cue-utilization. He assumes that "(a) simultaneous use of task relevant and task irrelevant cues reduces the effectiveness of the response to some extent, and (b) that as the total number of cues in use is reduced, task irrelevant cues are excluded before task relevant ones". For any task, provided the task is within the capacity of the child, as anxiety increases so irrelevant cues are reduced. When all irrelevant cues have been excluded further reduction in the number of cues employed can only effect relevant cues and therefore proficiency will fall.

Dealing with the introversion - extraversion continuum Eysenck makes use of two hypothetical constructs - derived ultimately from Pavlov and Hull - inhibition and excitation. These two are poles in a proposed cortical theory based on Hull's (1943) theory of reactive inhibition. Excitation refers to "Cortical processes of an unknown character which facilitate learning, conditioning, memory, perception, discrimination, thinking, and mental processes generally, whereas inhibition has the opposite effect of reducing the efficiency of the cortex" (Eysenck 1967 p.75). Eysenck (1957)<sup>(3)</sup> asserts "Human beings differ with respect to the speed with which excitation and inhibition are produced the strength of the excitation and inhibition produced and the speed with which inhibition is dissipated. These differences

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(3) Quoted Eysenck 1967 p. 79.

are properties of the physical structures involved in making stimulus - response connections... Individuals in whom excitatory potential is generated slowly and in whom excitatory potentials so generated are relatively weak are thereby predisposed to develop extraverted patterns of behaviour... individuals in whom excitatory potential is generated quickly and in whom excitatory potentials so generated are strong, are thereby predisposed to develop introverted patterns of behaviour..."

Experimental support for this thesis has been found in studies of involuntary rest pauses, blocking, conditioning, and perceptual phenomena; and of autonomic reactions among others. These are well documented by Eysenck in his "Biological Basis of Personality" (1967) and also by him in collaboration with his wife in "Personality Structure and Measurement" (1969).

CHAPTER V

STUDIES ON THE RELATIONSHIP BETWEEN INTROVERSION -  
EXTRAVERSION, NEUROTICISM - STABILITY, AND SCHOOL  
PERFORMANCE.

The use of the terms "anxiety" and "neuroticism"

In 1963 EYSENCK differentiated between neuroticism and anxiety. Neuroticism, he wrote was "an inherited psychophysical disposition closely linked with the lability of the autonomic system, which governs a person's emotional reactivity and may predispose him to the development of neurotic disorders under suitable circumstances". Anxiety was "a conditioned fear reaction which is particularly characteristic of dysthymic neurotics, i.e. of persons who are high on the factor of neuroticism and also on the factor of introversion which is significantly correlated with Conditionability... The position is rendered rather confused by Cattell's use of the terms "neuroticism" and "anxiety" which is exactly the opposite of mine". CHILD (1964) a year later, however, could write "Since N and anxiety are highly correlated, it is assumed that similar qualities as psychological definitives are being measured". ADCOCK (1965) suggested the two terms should correspond and EYSENCK and EYSENCK (1969) appear to consider the same dimensions are being measured. NAYLOR (1972 p.48) discussing Cattell's and Eysenck's dimensions writes that anxiety and neuroticism are highly associated. Accordingly throughout this review and later the terms anxiety and neuroticism are synonymous.

Eysenckian theory predicts that extraversion militates against high attainment; that there is a positive relationship between introversion and high attainment; and that there is a positive relationship between low neuroticism and high attainment. It further predicts that the relationship between neuroticism and high attainment is an inverted u shape - in accordance with the Yerkes - Dodson "Law," i.e. neuroticism affects high attainment only to an optimum point beyond which it has deleterious effects.

Studies on the relationship between introversion - extraversion, stability - neuroticism, and scholastic performance are reviewed here in the following manner:-

- (i) the relationship between introversion - extraversion and performance at school level;
- (ii) the relationship between introversion - extraversion and performance at higher education level;
- (iii) the relationship between stability - neuroticism and performance at school level;
- and (iv) the relationship between stability - neuroticism and performance at higher education level.

- (i) The relationship between introversion - extraversion and performance at the school level.

BANKS (1964) reports that in primary school children extraversion appears to be a positive influence on attainment. BUTCHER et al (1963) comparing twelve to fourteen year old American and British schoolchildren on Cattell's H.S.P.Q. found that, apart from intelligence, extraversion (sociability) was a most consistent factor

correlating positively with attainment. RUSHTON (1966) found that according to Cattell's Children's Personality Questionnaire well-adjusted, extraverted eleven year old children tend to have a higher scholastic attainment as assessed by the Moray House Attainment Tests. In a study of ninety three children of both sexes with a mean C.A. of 7years 11months SAVAGE (1966) found the correlation between extraversion and Arithmetic Quotient positively significant at the .05 level; while the correlation between extraversion and Reading Quotient failed to reach to .05 level of significance by only .009. SAVAGE concluded that high extraversion appears to be related to a brighter intellectual level and higher academic attainment in these children.

RIDDING (1967) on a sample of six hundred boys and girls from the lower forms in Manchester schools found, in a study of over - and under - achievement, i.e. a study of the relative rather than the absolute level of attainment, that extraversion was correlated with over - achievement, and introversion was correlated with underachievement.

EYSENCK and COOKSON (1969) analysed the scores of 4,000 eleven year old boys and girls on the Junior Eysenck Personality Inventory in relation to their performance on scholastic and ability tests at the primary school leaving age. They concluded that extraverted boys and girls do better both scholastically and on verbal reasoning tests than do introverted boys and girls. Extraverts were superior in reading at the .001 level.

WILSON (1972) sums up his study of ten year olds with the categorical "What is unequivocally clear is that pupils who see themselves as extraverted are those pupils who do best in basic attainments in the primary school..."

"Neutral" results were found by CALLARD and GOODFELLOW (1962) who administered the Junior Maudsley Personality Inventory to 3559 boys in one Secondary Modern and four Grammar Schools and found no relationship between Extraversion and attainment. Nor did ENTWHISTLE and CUNNINGHAM (1968) in a study of 2707 Aberdeen children aged about thirteen. They however demonstrated a sex difference, - extraverted girls and introverted boys being more successful in school work than children with the opposite personality characteristics. This agrees with RIDDING'S (1966) finding that girls exhibited more extraversion than boys, but Wilson (1972) found no demonstrable sex difference.

On the other hand CHILD (1964) did not come to a non-significant "neutral" conclusion but concluded significantly along the lines indicated by Eysenckian hypothesis. In an analysis of a small group of promoted ( $N = 17$ ) and demoted ( $N = 14$ ) school children he concluded that the former were significantly ( $P = .05$ ) introverted while the latter tended to be extraverted. He also found that on a larger sample of 138 pupils there was a positive correlation between stable introversion and attainment measured by the term examination. The neurotic extravert was least successful.

It appears that as far as school children (and predominantly primary school children) are concerned, there is evidence strongly suggesting that extraversion is not disadvantageous, as Eysenck's theory would predict, but rather the opposite, with respect to performance. This picture, however, changes somewhat when research dealing with students in higher education is considered.

(ii) The relationship between introversion - extraversion and performance at higher education level.

Successful university students were found by FURNEAUX (1957) to score low on Extraversion. BROADBENT (1958) compared Cambridge graduates having good degrees with those having poor degrees. The former were significantly more introverted than the latter and as the two groups did not differ significantly in I.Q. this suggests that extraversion - introversion acts independently of I.Q. in affecting attainment.

LYNN (1959) found a significant positive correlation between introversion and attainment among first year university students based on their 'A' level performance. He found also that extraversion had wider detrimental effects on attainment than had been posited by Furneaux (1957). BENDIG (1960) using the Maudsley Personality Inventory found that there was a tendency among American university students for the introverted student to do well in introductory psychology courses.

LYNN and GORDON (1961) cited indirect and tenuous evidence for the relationship between Extraversion and attainment - delinquents have extraverted behaviour patterns and tend to be educationally retarded; introverts tend to be leptomorphic (i.e. Kretchmer's lean, linear somatotype) and leptomorphic children tend to be good readers; women tend to be more introverted than men as a general rule and girls tend to be better attainers than boys. In their own study of sixty university students Lynn and Gordon found that extraverted students underachieved in tasks of complex learning and persistence, and concluded they did so because they displayed a tendency to tire easily and give up more quickly - as would be expected from Eysenck's theories of cortical inhibition and excitation.

SAVAGE (1962) found significant positive correlations between introversion and attainment among Australian students, and later with Gibbons (GIBBONS & SAVAGE 1965) demonstrated a low but significant correlation between extraversion and failure. Again KLINE (1966) administering the Eysenck Personality Inventory to first year Ghanaian students found that extraversion was negatively correlated with success.

The above eight studies suggest a somewhat different picture in higher education for the part played by introversion - extraversion than that played at a younger age level. There is a broad measure of agreement that extraversion is detrimental to academic performance at the higher education level. This raises the interesting speculation as to how the introverted primary school failure becomes the succeeding introverted student. NAYLOR (1972 p.65) puts the apparent paradox in these terms: "Eysenck's theory of personality types whose genesis is constitutional suggests that I - E and N are relatively fixed properties of the individual. On this basis it does not seem possible to infer the profound changes in personality which the empirical results would require. If, on the other hand, there is good reason to believe that pupils who start out as high or low attainers tend to continue as such, then one can infer that their personality characteristics do change".

To explain this question of a change in the relation of Extraversion (and Neuroticism) to performance as education progresses EYSENCK and COOKSON (1969) posit the concept of the "late developer" - introverts may be late developers, and introverted boys develop more quickly than introverted girls. WILSON (1972) however,

points out that from his own study and from "the known correlational evidence" one must assume that the introverted primary school failure does become the succeeding fifteen year old, and that longitudinal evidence in the cognitive field offers no support for such an assumption. He himself proposes "... a developmental reversal of personality introversion-extraversion throughout adolescence ..., including a differential rate of reversal between boys and girls. It is further tentatively suggested that such a developmental reversal of extraversion - introversion self attitudes [which self attitudes he had previously described as being of great importance to success or failure] may well be a function of changing academic climate: at the primary stage the able, successful pupil finds himself in an activity-directed 'extraverted' learning situation; in later and late adolescence, the able student finds himself in a learning situation which is increasingly selective, 'bookish', and 'introverted'."

(iii) The relationship between stability - neuroticism and performance at the school level

CASTANEDA et al (1956) using the Children's Manifest Anxiety Scale found a negative correlation between neuroticism and children's achievement. In a cognate study, McCANDLESS and CASTANEDA (1956) found that the negative correlations between anxiety scale scores and academic achievement were - .32 for fifty five twelve year old boys and - .59 for forty five twelve year old girls. NICHOLSON (1958) - in a problem which required discovering and remembering which of two buttons turned out which of a randomly presented series of red, blue, amber and white lights -

reported that the most anxious twenty per cent of the thirty six ten year olds made more errors in each of twenty trials than did the least anxious twenty per cent. MORGAN et al (1960) obtained a negative correlation between anxiety and achievement in eleven and twelve year old girls.

HALLWORTH (1961) compared Secondary Modern and Grammar School pupils and found a higher correlation between anxiety and the lower attaining (Secondary Modern) pupils than the correlation between anxiety and the higher attaining (Grammar School) pupils. Using the Junior Maudsley Personality Inventory, CALLARD and GOODFELLOW (1962) carried out a similar study of comparisons of anxiety between Grammar School populations and Secondary Modern School populations, and within the achievement streams of these schools. They found a higher anxiety score was related to lower achievement. The Grammar School boys had significantly lower anxiety scores than had the Secondary Modern boys. Within each type of school less intelligent groups tended to have higher anxiety scores. Again FELDHUSEN and KLAUSMEIER (1962) while assessing the relationship between anxiety measured by the Children's Manifest Anxiety Scale, and I.Q., reading, and arithmetic, found a tendency toward negative correlation.

CHILD (1964) categorized anxiety into high, medium and low (as is done in the present study). Neither high nor medium anxiety was advantageous to attainment. Extraverted children who were low on anxiety had a lower mean attainment score than any other group; the influence of anxiety appeared to be stronger in the case of extraverts than in the case of introverts in relation to attainment.

FROST (1968) obtained consistent negative relationships between anxiety and various standardized tests and teachers' marks in nine to eleven year old Canadian boys and girls. He also found that children at a predominantly working class school had a higher level of anxiety than those from a middle class school thus confirming similar findings mentioned above by Hallworth (1961), Callard and Goodfellow (1962) and later by REGAN (1967).

RUSHTON (1966) in his study of eleven year olds found that emotional maturity appeared to assist children; and that the more relaxed children tended to do better at English. SAVAGE (1966) concurred with this in his study of seven to nine year olds. Here he found a significant negative correlation between anxiety and reading; and a low positive but non-significant correlation between anxiety and intelligence, and between anxiety and arithmetic - this latter being quite unusual. He asserted that the intelligence and arithmetic test situations did not produce untoward anxiety in his sample though the reading test situations might well have done so. Savage's study is unusual in that it appears to be one of very few which has studied children at such a young age.

MEHRYAR (1967) using the Junior Maudsley Personality Inventory on seventy nine children of both sexes aged twelve to fourteen years four months from an East London Secondary Modern school states that those who admitted a greater number of neurotic tendencies tended to be rated by their classmates as poor in academic standards. ENTWHISTLE and CUNNINGHAM (1968) in their large Aberdeen study concluded that anxiety showed a significant negative correlation with school attainment. Both boys and girls with high anxiety scores tended to be less successful than those with low anxiety scores.

Though Eysenck and Cookson (1969) reported that "the significance of Neuroticism as a main effect is marginal" the burden of the above researches into the relationship between Neuroticism and attainment at school level appears to be that neuroticism as opposed to stability is detrimental to performance at the school level.

(iv) The relationship between stability - neuroticism and performance at the higher education level.

Most research into the relationship between anxiety and scholastic performance at the higher education level finds that they are positively related.

A positive relationship between anxiety and the academic attainment of university students was found by FURNEAUX (1957). LYNN (1959) suggested anxiety was a factor in educational success. He found that university students' mean anxiety score is approximately one standard deviation above the mean for the general population. LYNN and GORDON (1961) found that anxiety helps attainment because of its relationship to size of vocabulary and suggested that Himmelweit's finding that dysthymics' having good vocabularies could be due to their having a higher degree of anxiety. FURNEAUX (1962) found that anxious students, whether introverts or extraverts, produced better examination results than stable introverts or extraverts. GIBBONS and SAVAGE (1965) reported an extremely small correlation in training college students.

On the other hand KLINE (1966) in his study of first year university students found anxiety negatively, though not significantly, related to academic performance.

BENDIG (1960) found no relationship between anxiety and attainment in American students, nor did COWELL and ENTWHISTLE (1971) among 117 students taking O.N.C. courses in a Technical College. KLINE & GALE (1971) found no stable pattern of correlations between extraversion and neuroticism and academic performance for 455 Exeter University students. They concluded it would be unwise to state as a general finding that academic success is related to personality variables.

However, I.G. SARASON (1961) suggested that test anxiety should be taken into account when evaluating candidates for college places. His study of 738 men and women enrolled in introductory psychology and sociology courses at the University of Washington reported that all correlations between test anxiety and intellectual measures were negative. SPEILBERGER (1962) examined the relationship between anxiety and attainment achieved by anxious and non anxious male college students for a single semester's work. He found that anxious students in the middle ranges of ability obtained lower grades and a higher percentage of academic failure than non anxious students of comparable ability; a higher percentage of low ability students with high anxiety were academic failures than were the non anxious students of lower ability. There was no difference in students of high ability.

The burden of the studies reviewed here therefore is that at the tertiary level of education anxiety appears to be positively related to scholastic performance but this positive relationship is not as clear cut in terms of numbers of supporting studies as is the relationship between anxiety and poor scholastic performance at the school level.

CHAPTER VI

A BRIEF REVIEW OF THE EFFECTS OF ANXIETY  
UPON READING AND ARITHMETIC ABILITY; AND  
ITS EFFECTS UNDER DIFFERENT STRESS  
CONDITIONS.

A. Anxiety as a help to reading.

BURT (1937) suggested "It is possible some children do not learn to read because they are not anxious enough... the anxious and solitary child may become an avid reader to satisfy his needs in fantasy as an escape from the real world or simply from the ambition of success which often characterizes anxious children". He adds anxiety states "... are less likely to retard school progress: on the contrary they often prove a source of extra effort and even of overwork". (p.553). JASTAK (1941) noticed that neurotic children are frequently overachievers in reading while children low in anxiety did poorer in reading than in arithmetic. CHAZAN (1962) was much in agreement with these findings.

LYNN (1956) suggested that highly anxious children overachieved and implied that low anxious children underachieved in reading. In the following year he found a positive association between anxiety and "better reading than arithmetic". (LYNN 1957). He too like Burt, suggested insufficient anxiety may lead to poor reading ability. COX (1964) reported small, positive correlations between anxiety and reading in his sample of ten and eleven year old Australian children.

B. Anxiety as a hindrance to reading.

KERRICK (1955) found among an adult group - U.S. Air Force trainees - a high negative correlation between anxiety and reading. McCANDLESS and CASTANEDA (1956) found that high anxiety interfered most with the more complex skills such as reading and arithmetic.

KENT and DAVIS (1957) suggested that the home attitude was important and found that those children from "Normal" and "Demanding" homes were reading in accordance with their age and ability; children from "Overanxious" homes were having some success but were slightly below the "Normal" and "Demanding" group; while those from "Unconcerned" homes were lower in I.Q. and had a significant failure in reading. Their finding was supported by PATTERSON et al (1960) who reported that a high level of anxiety interferes with complex learning; and by FELDHUSEN and KLAUSMEIER (1962) who reported a negative correlation of - .48 for boys and - .38 for girls.

KELLER and ROWLEY (1962) found negative correlations between the CMAS and a variety of measures of achievement - the highest being with word knowledge and reading. Using the same instrument FROST (1968) came to a similar conclusion vis-a-vis reading.

LUNNEBORG (1964) gave three anxiety scales - TASC, CMAS, and GASC - to 213 boys and girls aged ten to twelve years and found for each year group that high anxiety was related to poorer achievement in reading; as also did STEVENSON and ODOM (1965) with a similar age group, and COWEN et al (1965) with nine year olds.

C. The effects of anxiety upon arithmetic.

The writer was unable to find any study excepting one part of BIGGS (1962) showing that high anxiety was related to good achievement in arithmetic.

JASTAK (1941) suggested that although the neurotic child overachieved in reading, he underachieved in arithmetic. KERRICK (1955) whose subjects were adults in whom, perhaps, mechanical arithmetic facts would be better established than in children, found that although anxiety affected arithmetic much less than it affected reading - an unusual conclusion - nevertheless they were still negatively related. McCANDLESS and CASTANEDA (1956) found high anxiety to interfere with arithmetic as also did LYNN (1957).

BIGGS (1962) using both TASC and GASC in a study of nine and ten year olds found both these tests scores to be negatively associated with mechanical arithmetic but not so with mechanical concept scores. LUNNEBORG (1964) found high anxiety associated with poorer achievement in arithmetic.

COX (1964) in a sample of 262 fourth and fifth grade Canberra children found a negative correlation as also did FROST (1968) using two measures of "School Anxiety" and "General Anxiety" derived from MAS, CMAS, and GASC. COWEN et al (1965) for 394 nine year olds in New York found a negative (but non-significant) relationship between anxiety, as measured by the CMAS, and arithmetic computation and reasoning, and, unlike Biggs, a significant negative relationship between anxiety and arithmetic concepts.

GAUDRY and SPIELBERGER (1971) have HILL and SARASON<sup>(1)</sup> (1966) citing various studies of high school and College students in which the relationship is negative.

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(1) Cited in Gaudry and Spielberger 1971 p.36.

D. The effects of anxiety on performance under different stress conditions.

In an interesting review of the effects of anxiety on test performance under different degrees of stress, Gaudry and Spielberger<sup>(2)</sup> cite two studies which suggest that where tests are carried out under stressful conditions high anxious students tend to be at a disadvantage, while they appear not to be so under non-stressful conditions.

WRIGHTSMAN (1962) gave the MAS and a timed measure of intelligence to 234 first year Tennessee students under two test conditions. Group A were led to believe that the results of the test were of great importance and might affect their entire college career. Group B were told the data were being collected for normative purposes. Results showed there was little difference in the performance of the low anxious students in the two conditions, whereas the high anxious given stressful instructions performed almost one standard deviation lower than the high anxious given non stressful instructions.

In a similar study CARON (1963) gave two groups of high school students a 1,700 - word passage about psychological theory to read. Group A studied the passage and was tested under examination conditions, group B the 'curiosity' group was led to believe that they were studying the passage so they could interpret data on their own personality profiles. On a complex comprehension test there were no differences between high anxious and low anxious students, in the 'curiosity' condition, but low anxious students did significantly better than the high anxious in the 'examination' condition.

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(2) Ibid p. 29.

These findings suggest that in complex learning explicit statements about the importance of the work militate against the high anxious student. Gaudry and Spielberger suggest that "anxiety is unrelated to performance if a test is seen to be of little importance, but when the test is personally important, as is the case with most school examinations, anxiety impairs performance". (p29.)

CHAPTER VII

BEHAVIOURAL AND PERFORMANCE CHARACTERISTICS IN  
CHILDREN SUBSEQUENT UPON A) EMOTIONAL DISTRESS  
TO THE MOTHER DURING PREGNANCY, AND B) PARENTAL  
EMOTIONAL DISTURBANCE.

A. Introduction.

The area of emotional stress can be a tenuous one in which what is sauce for the goose need not be so for the gander. The researcher dealing with retrospective and subjective material relies heavily upon the parents as a source of information and there is a strong possibility of a selective and distorted quality in the parents' reports<sup>(1)</sup>. A number of studies reveal just how unreliable such reports can be. KOHN and CARROLL (1960) found that mothers who knew that the fathers and the children were also to be interviewed gave more favourable reports concerning the father than did mothers who knew they alone were to be interviewed. PYLES et al (1935) compared mothers' reports when 252 children were twenty one months old with earlier records of the same developmental period. The earlier records were based on data obtained by trained workers. Mothers' reports of when their children first walked alone were correct in 49% of the cases, and the ages given for the appearance of the first tooth were correct in only 36% of the reports. Pyles et al concluded that mothers tended to err in the direction of suggesting precocity and they noted that mothers with several children showed

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(1) The writer recently interviewed a father who totally reversed the role his wife and he played towards an adolescent son. The rather damning emotional and attitudinal behaviour he had ascribed to his wife was in fact his own behaviour.

a greater tendency to err than did mothers with only one child.<sup>(2)</sup> Mothers' retrospective accounts of pregnancy and delivery were so unreliable as to be disregarded completely.<sup>(3)</sup> WENAR and COULTER (1961) reinterviewed twenty one mothers who three to six years earlier had brought their children to a therapeutic nursery school. When interview data which had been obtained at the earlier time were compared with recall data, different inferences were drawn from the two sources in forty three per cent of cases - forty per cent being striking changes or even reversals of the two sets of "facts".

RUTTER (1972) quotes WHITTEN et al's (1969)<sup>(4)</sup> study which clearly showed mothers lying in retrospective case histories.

A study such as the present one therefore must take cognizance of these cautionary notes when dealing with this kind of "soft" data.

B. Possible effects of perinatal emotional distress on children's behaviour and scholastic performance.

It is an almost universal belief that emotional stress plays a part in the pre-natal environment and that this stress may affect the child who is being carried, thereby interfering with the otherwise normal process of pregnancy. Data is for the most part "soft" being based usually on retrospective correlational studies rather than on the direct experimental manipulation of variables. As HERBERT (1974) remarks "Unfortunately, observations concerning the effects of prenatal influences on postnatal developments in the child are contaminated by the mother's handling of her baby after birth, and by genetic factors which cannot be controlled" (p.37).

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(2) Cited in HURLOCK (1950) p.17.

(3) Cited in YARROW (1963)

(4) Cited in RUTTER (1972) p.96.

Herbert (p.38) discusses the speculated mechanism whereby a pregnant woman's emotional distress may influence the foetus.

"Emotional conflicts and their physiological concomitants mediated by the endocrine system and the hypothalamus may exert an influence upon the contractility of the uterus, vascularization and oxygenation. Ferreira (1965) outlines several channels through which the pregnant woman can let her child 'know' of her distress and negative attitudes. Montagu (1962) suggests that under the influence of the psychosomatic state of the mother the foetus may become 'sensitized' to postnatal stress; it develops abnormal patterns of response that carry the potential for being translated into postnatal 'neurotic' behaviour. He speculates that if a foetus is exposed, during the critical period for the development of his hypothalamic structures, to a high level of adrenergic substances (resulting from maternal psychosomatic response to stress) he will adapt to this changed biochemical environment as if it were the normal state of affairs. Foetuses which are exposed to lower levels of adrenergic substances during the critical period will adjust to these levels. This may lead to the creation of permanent adaptation levels; these affect the individual after birth in the sense that he will require higher (or lower) production of adrenergic substances regardless of environmental conditions".

Many environmental factors have been suggested as causes of stress in pregnancy. PARFITT (1952) emphasized illegitimate pregnancy. OSMOND (1953) suggested unsatisfactory social conditions in which the newly delivered mother had more to do than was good for her. OSTWALD and REGAN (1955) suggested mother domination, KLEIN et al (1950) and TOD (1965) marital conflict and economic stress. GORDON et al

(1959) suggested a recent move to the suburbs, the absence of the husband at the time of childbearing, and lack of health in the family. BISKIND (1958) reported that fear of pain and death, sexual taboos, and ambivalence towards their pregnancy, husbands, and mothers were factors causing stress.

It is proposed here to look at some typical research into this question from the study of animals and humans. Human research makes use of an epidemiological approach and is retarded by the difficulties of controlling genetic and post-natal variables in order to attribute conclusively such differences as are under investigation to pre-natal variables; animal research makes use of the experimental method - different treatments are administered to females during gestation and the characteristics of their offspring are compared to characteristics of the offspring of untreated females.

#### 1. Studies involving animals

The methodology of animal experiments necessitates a study of stress of a kind less severe than extreme environmental stress and which is assumed not to affect the foetus directly but only through the mediation of the mother. Experiments such as described by SOBIN (1954) where it was found that congenital heart disease could be engendered in the offspring of pregnant rats by exposing them to the stressful conditions of being rotated in a drum at various speeds of revolution do not fulfil the above criteria in that the stress to the foetus may be directly caused by the rotations rather than mediated through the mother.

Thompson's is the method generally adopted to expose pregnant animals to stress while at the same time reducing the possibilities of directly stressing the foetus. (THOMPSON 1957). Here animals are trained in shock avoidance before mating. They are then mated and are returned to the apparatus for varying periods during pregnancy. A fear evoking stimulus is presented without shock and the animal is prevented from escaping. In this way the direct effects of shock on the foetus are avoided and the only effects on the foetus are those presumably mediated by the mother (though there still remains the question of the part played by the C.S.)

In Thompson's 1957 experiment the offspring of rats so exposed showed significantly more anxiety than offspring of those not so exposed. The C.S. however was a buzzer which might have directly affected the foetus. MORRA (1965) controlled for the effects of the C.S. in Thompson's experiment. He used two experimental groups - (i) as in the 1957 experiment except that the operant response of the pregnant rats was not blocked;

and (ii) the second group of pregnant rats was given the same exposure to the buzzer but without any avoidance conditioning.

The offspring of both these experimental groups were significantly more active than the offspring of a control group.

A later study by THOMPSON et al (1962) reported four experiments designed to explore the possible effects on offspring behaviour of prenatal maternal stress. Three types of stress were used -

- a) conditioned anxiety;
- b) electric shock prior to pregnancy;
- and c) adrenalin injection.

Offspring of emotionally stressed mothers tended to show a lowered activity level and a higher incidence of defaecation. Thompson et al concluded pre-natal stress treatment increased the emotionality of the offspring.

## 2. Studies involving humans.

In a monograph KLEIN et al (1950) found every one of their primiparae to be anxious - over themselves, the baby, and economic and marital problems. The most common cause for anxiety was somehow being damaged by the foetus. The authors commented that pregnancy proved a potent catalyst for potential anxiety. PATTERSON et al (1960), in a study of the relationship between planning of pregnancy and reported symptoms during pregnancy, gathered data by questionnaire from eighteen mothers of schizophrenic children, thirty seven mothers of neurotic children, and twenty eight mothers of normal children. They found that there were more symptoms such as nausea, vomiting, haemorrhage and depression in unplanned than in planned pregnancies. SEAGER (1960) found a higher incidence of anxiety proneness in a group with puerperal mental illness than in a normal puerperal group. DAVIDS and DE VAULT (1962) administered a comprehensive battery of psychological tests to fifty clinic patients in the third trimester of pregnancy. Following childbirth the mothers were classified by experienced obstetricians into a "normal" and a "subnormal" subgroup on the basis of signs of delivery-room complications and childbirth abnormalities. Statistical analyses of findings from the psychological assessment revealed that women who

were later to experience complications and difficulties in childbirth were markedly more anxious during pregnancy than women who did not experience such complications and difficulties.

These studies provide some evidence that emotional stresses during pregnancy are associated with at least labour and birth difficulties. Can such emotional stresses be associated with post-natal behavioural characteristics?

In research based on human pregnancy histories ROGERS et al (1955) studied the birth records of behaviour problem children in Baltimore schools and came to the conclusion that "Abnormalities of the pre and post natal periods were found to be significantly associated with behaviour disorders in children". TURNER (1956) reported on seven to ten day old children of one hundred mothers who were examined without knowledge of their identity or history, and information on each baby's feeding and general behaviour was obtained from nursery staff. Babies whose feeding difficulties were attributable to physical causes, and those who might have suffered from anoxia or brain damage were excluded. Of the one hundred surveyed, seventy one mothers stated they had no undue emotional stress during pregnancy - these all produced normal babies. Five of thirteen babies with the "irritability - fussiness" syndrome had mothers who reported that they had been under unusual emotional stress during pregnancy. Turner did not regard her evidence as conclusive "but it does suggest to me that my impressions that the irritability - fussiness syndrome was directly related to pre natal emotional stress may have some justifiable basis".

DAVIDS et al (1963) reported that the children of women who had been highly anxious during pregnancy fared less well on indices of emotional adjustment. FERREIRA (1965) reported that fetuses whose hyperactivity were attributable to emotional stress, became hyperactive children. He quotes Sontag's experiments which demonstrated that many hyperactive fetuses had become the nursery's "neurotic" children whose behaviour was characterized by "conspicuous shyness, apprehension, in social contacts, reluctance to join in play and greater anxiety in the face of perceived aggression". SONTAG (1966) in an overview of his years at the Fels Research Institute describes eight mothers suffering from acute emotion. "Children of such mothers... showed, of course, no congenital defect. In general they were, however, irritable, hyperactive, tended to have frequent stools, and three of them had marked feeding problems". WALLIN and RILEY (1950) described the children of mothers who had negative attitudes towards their pregnancy as having six kinds of behaviour disturbance: - irregular eating, many bowel movements, wind pains, inability to sleep at night, too much crying, and unusual needs to be held.

MUSSEN et al (1963) say that the reports "agree in suggesting that various aspects of the mother's personality, attitudes... influence the prenatal environment of the child and thus affect his subsequent well - being". And RUTTER (1972 p.31) summarizes the situation when he says"... perinatal trauma (UCKO 1965) and environmental influences (ZIGLER 1966) probably all play a part. The importance of these individual differences has been shown by their association with the child's later behavioural disturbances (RUTTER et al 1964, THOMAS et al 1968) and educational performance (KAGAN et al 1965)".

C. Possible effects of parental emotional disturbance on children's behaviour and scholastic performance.

LURIE (1970) in a study of eight hundred three to eighteen year olds showed that emotional impairment is related to family functioning. MELNICK and HURLEY (1969) in a comparative study of ten child abusing mothers and ten control mothers found the abusing mothers had a history of emotional illness, and HARLOW (1962) has shown that monkeys who are neurotic mothers display a "sociopathic syndrome" and are unable to rear their children in a healthy atmosphere.

BECK and LEMPP (1969) comparing 240 children from abnormal family situations with 254 normal families reported that educational problems are significantly dominant among children from families who have disturbed emotional situations. DE et al (1970) reported a significant negative correlation between a maladjusted emotional family environment and academic motivation.

In a study of eighteen families of high I.Q. offenders, FREEMAN and SAVASTANO (1970) found seven had overt marital difficulties, three portrayed unusually high aggression by the father, and in one the father was an alcoholic. They concluded that a high level of emotionality in the home was associated with disruptive behaviour and academic underachievement. STERLE (1970) comparing Slovenian achieving eight year old boys with underachievers found that in the underachievers' homes there was a greater incidence of alcoholism and illness, and more frequent emotional pressures.

WALL (1973) quotes a French study by CHILAND (1971) which distinguished three groups of family background: - those substantially without psychological disturbance; those with a constellation of difficulties not of a marked or serious kind; and those where clearly psychopathological difficulties were present. Their attainments in school were intensively studied throughout the primary. The first group's attainments were normal or accelerated. Ten out of the thirty four in the second group showed a deterioration in I.Q. of more than seven points; only nine were in classes normal for their age or better: the rest were retarded - eight seriously so. In the third group - really two subgroups - the one with serious parental disturbance, the other both socially and psychologically unfavourable - the picture was much more serious; of the fifteen children, two seemed to be stable, and two others better than could be expected; the eleven remaining had great difficulties. In the first subgroup four showed a decline in I.Q., and six out of the eight were backward in school. Of the seven in the second sub-group only one showed a fall in I.Q. though all had a massive retardation in school.

MCINTIRE and PAYNE (1971) studied twenty one boys and two girls (average age 9.2 years) all of whom were maladjusted in school. School achievement was assessed by teachers' grade and a WISC assessment. They found that adequacy of intrafamilial function, characterized by social relationships, was related positively to school achievement and that such functioning was at least equal to that of I.Q. in predicting school achievement.

It appears therefore that in families where there is emotional disturbance in the parents, there is likely to be emotional disturbance and underachievement in the children.

PART THREE

THE PRESENT INVESTIGATION

CHAPTER V111

AIMS AND SELECTION OF SUBJECTS

The aims of this research can be divided into three areas.

- I. To investigate by correlation analysis the associations between obtained reading and arithmetic ages (known throughout as ATTAINMENT scores) and
  - a) verbal intelligence,
  - b) chronological age,
  - c) the Accepting and Rejecting attitudes of parents towards their children,
  - d) the personality factors, in the children, of Neuroticism and Extraversion,
  - e) perinatal emotional distress in the mother,
  - and f) emotional disturbance in the parents.
- II. To investigate by zone analysis the associations between variables c) to e) above and different levels of achievement in reading and arithmetic. These levels are under, normal, and high achievement. They are derived by a regression equation in which Verbal I.Q. and C.A. are the variables used to predict reading and arithmetic ages. These different levels are referred to as ACHIEVEMENT levels.
- III. A multivariate regression analysis is used to determine the individual contribution to the variance in attainment of each of the variables a) to f) in I above.

The research deals principally with reading and there are two subsidiary areas - one investigating arithmetic, the other the reading attainment and achievement of a group of brain-injured children.

### HYPOTHESES

#### HYPOTHESIS I

Using the syndromes of Acceptance and Rejection outlined by NURSE (1964), there appears to be strong agreement in the literature concerning these attitudes and their association with scholastic achievement. BALDWIN et al (1945), HALL (1966) and LYTTON (1968) are typical of those who support such a relationship. Accordingly this research posits that PARENTAL ACCEPTANCE OF THE CHILD IS ASSOCIATED WITH HIGH ATTAINMENT AND WITH LEVELS OF NORMAL AND HIGH ACHIEVEMENT IN THE CHILD, AND REJECTION IS ASSOCIATED WITH LOW ATTAINMENT AND UNDERACHIEVEMENT IN READING AND ARITHMETIC.

#### HYPOTHESIS II

Following the empirical work of such as PATTERSON et al (1960), COX (1964) and LUNNEBORG (1965), this research posits that STABILITY IS ASSOCIATED WITH HIGH ATTAINMENT AND WITH LEVELS OF NORMAL AND HIGH ACHIEVEMENT WHILE HIGH NEUROTICISM IS ASSOCIATED WITH LOW ATTAINMENT AND UNDERACHIEVEMENT IN READING AND ARITHMETIC.

#### HYPOTHESIS III

There appears to be majority agreement - FURNEAUX (1957) BROADBENT (1958), LYNN (1959) and KLINE (1966)- that extraversion is detrimental to academic achievement in the tertiary education sector. However the reverse appears to be the case in the school sector. RIDDING (1967) and EYSENCK and COOKSON (1969) are typical of those who report that the extraverted school child is more likely to achieve than is the introverted child. Accordingly this research posits that

INTROVERSION IS ASSOCIATED WITH LOW ATTAINMENT AND WITH UNDERACHIEVEMENT, AND EXTRAVERSION WITH HIGH ATTAINMENT AND WITH ACHIEVING LEVELS IN READING AND ARITHMETIC.

#### HYPOTHESIS IV

WALLIN and RILEY (1950), ROGERS et al (1955), STOTT (1959) and SONTAG (1966) suggest there is a relationship between Perinatal Emotional Maternal Distress and the infant's subsequent behaviour. How long this relationship would continue is obscure as is also the connexion between this and scholastic achievement. This research posits that

THE PRESENCE OF PERINATAL EMOTIONAL MATERNAL DISTRESS IS ASSOCIATED WITH LOW ATTAINMENT AND WITH UNDERACHIEVEMENT IN THE CHILDREN'S READING AND ARITHMETIC.

#### HYPOTHESIS V

FREEMAN and SAVASTANO (1970), CHILAND (1971), and MCINTIRE and PAYNE (1971) are typical of the body literature which suggests that there is a negative relationship between Parental Emotional Disturbance and scholastic achievement. This is supported by a further body of literature which suggests that neurotic mothers are unable to rear their children in a healthy atmosphere.

This research therefore posits that  
EMOTIONAL DISTURBANCE IN THE PARENT IS ASSOCIATED  
WITH LOW ATTAINMENT AND WITH UNDERACHIEVEMENT IN  
THE CHILDREN'S READING AND ARITHMETIC.

#### HYPOTHESIS V1

It is further predicted that

- a) VERBAL I.Q. AND C.A. WILL CONSISTENTLY MAKE  
THE LARGEST CONTRIBUTION TO ATTAINMENT;
- b) PARENTAL ATTITUDE, NEUROTICISM, AND  
EXTRAVERSION FORM A GROUP OF VARIABLES  
WHICH WILL MAKE THE NEXT LARGEST CONTRIBUTION;
- and c) PERINATAL EMOTIONAL MATERNAL DISTRESS  
AND PARENTAL EMOTIONAL DISTURBANCE WILL  
MAKE THE LEAST CONTRIBUTION TO ATTAINMENT.

#### THE SUBJECTS

The subjects are seven to twelve year old boys and girls who attended Notre Dame Child Guidance Clinic, Glasgow, between 1969 and 1974. One hundred and thirty four boys and sixty five girls were given the Schonell reading test and of this group eighty six boys and fifty girls were given an arithmetic test. A further thirty four boys and girls comprise the Brain-injured Group to whom was given only the Schonell reading test.\*

The children taking part were a) those children who were clients of the writer in his capacity either as therapist or remedial teacher; and b) those children who attended play therapy groups. It did not follow, however, that all such children were included in the study.

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\* One child in the Brain-injury Group was under 7 years.

CRITERIA FOR EXCLUSION FROM THE STUDY.

The following children were excluded:

- (1) children who were attending the clinic because of speech or auditory defect;
  - (2) children who had been attending the clinic for more than three months before the psychological and attainment tests could be administered;
  - (3) children who had been attending their present school for less than one year;
  - (4) children who had an I.Q. below low average - the criterion being either a Binet or a Full Scale W.I.S.C. I.Q. less than 80;
  - (5) children who had had a grossly unusual life history;
  - (6) children who were, or who had recently been using Pitman's Initial Teaching Alphabet;
  - (7) adopted children;
- and (8) those who manifested signs of brain injury - these later, if they were not excluded by the other criteria, formed a subsidiary group.

Children who attended because of speech or auditory defect were placed in a different category from other children by the clinic authorities - even their files being kept separately. Their exclusion therefore entailed little value judgement on the writer's part.

The choice of more than three months attendance as an excluding criterion was arbitrary. Most children attended the clinic for more than one full year; the assumption was made that attendance of over three months might have changed sufficiently the attainment scores and so invalidated them as scores at the time of entry to the clinic. Thirty nine children remaining in the sample were tested in the third month, the vast majority being tested in the first four weeks of attendance.

The acceptable minimum Full Scale W.I.S.C. or Binet I.Q. of 80 was chosen simply to obviate the effects of "sheer inborn dullness" (Burt 1937 p.449) as a cause of underachievement.

Several schools in the sample's catchment area - Glasgow, Lanarkshire, Renfrewshire, and Dumbarton - teach reading by i.t.a. Since the reading test used - Schonell - is t.o. it was thought unfair to give it to the under nines who had been taught by i.t.a., and consequently they were excluded. So also were adopted children as for the most part there were large gaps concerning their early history. Where such information did exist it was taken to be too highly selective for inclusion.

Despite the problems of specifying brain injury, problems which are discussed by REED et al (1970)<sup>(1)</sup> it was thought that the inclusion of brain-injured children in such a small sample as this might well affect the results - though this does not seem to be considered by some other researchers who report on equally small or smaller examples without screening for brain injury.

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(1) An account of this discussion is given later.

See pages 90-92

In this research a brain - injured child is defined as one who:-

- a) had three or more highly significant brain-injury indicators measured on the Bender - Gestalt Test (Koppitz norms - KOPPITZ 1964). (Thirty nine children were considered brain injured on this criterion);
- and/or b) had been suspected of brain injury after psychiatric examination (a further eight were so considered);
- and/or c) had a report of abnormal patterning on an E.E.G. examination (one child was excluded having arrived with a previous report of abnormal E.E.G. patterning.)

The data concerning thirty four of these brain - injured children were later subjected to statistical analyses and the results are reported.

One boy who was not excluded under any of the above criteria was excluded on the grounds of his having had what was considered a grossly unusual life history - an eight year old whose father's life style had caused the child to spend his first five years travelling in many countries and in the company of successive nannies of different Eastern cultures.

CHAPTER 1X

THE CONCEPT OF UNDERACHIEVEMENT AND  
THE CRITERIA USED HERE TO ESTABLISH  
LEVELS OF READING AND ARITHMETIC  
ACHIEVEMENT

A. THE CONCEPT OF UNDERACHIEVEMENT.

When we speak of underachievement, or for that matter its corollary overachievement, we are making a value judgement that we know the expected achievement of any particular child. How can a child achieve more than he ought to achieve? Why ought he to reach a particular level of performance? The simple answer to this is that we do not know at what level a given child ought to perform; prediction of achievement is based mainly on the fact that there is a close relationship between intelligence and performance, and the correlation between these two, while high, leaves as can be seen in Table 1, an equally high or even higher proportion of the variance unaccounted for.

TABLE 1

REPRESENTATIVE VALIDITY COEFFICIENTS FOR  
PREDICTING COMPOSITE SCHOOL ACHIEVEMENT  
OF TESTS OF GENERAL INTELLIGENCE, SHOWING  
UNACCOUNTED VARIANCE.

TEST	GROUP	N	CRITERION	r with achievement	Unaccounted Variance
Stanford Binet	4th grade	50	Stanford Achievement	.63	60
W.I.S.C.	Single Elem- grade.	-	Iowa Tests of Basic skills	.66	56
Otis quick Scoring Mental Ability Alpha.	Hi school Seniors	83	Grades in high school	.69	52
Davis Eells Test	5th grade	56	Iowa tests of Basic skills	.44	81
Kuhlman- Finch	5th grade	56	Iowa Tests of Basic skills	.61	63
Terman- McNemar	11th grade	300	Essential High school content Battery	.62	62
California Test of Mental Maturity	3rd grade	100	Progressive Achievement Test.	.66	56

Adapted from Frandsen: Educational Psychology 1961 McGraw Hill  
 Table 4.7

Since there is such a large unaccounted for variance KOWITZ's (1964) questioning of our moral right to expect a child to reach any particular level of achievement, based as it is on incomplete prediction, may well be correct.

Nevertheless what is known as the underachieving child is not infrequently met with in schools. Regularly, school report cards are sent home with such admonitions as "Johnny could do better if only he would put his mind to it" or "Johnny must have his work at home supervised". Teachers write such reports on the assumption that Johnny is not working up to his potential performance, which potential is usually based on a further assumption that Johnny's ability is higher than his actual performance. This reflects the fact that there is an imperfect correlation between ability (normally defined in terms of I.Q.) and performance. The terms "under" and "over - achievement" tend to suggest that ability is the sole basis for predicting achievement. As NAYLOR (1972 p.19) says

"First ... Underachievement suggests that a potential indicated by ability is not being realised, and that the factors which militate against its realisation require explication. Second, the fact of overachievement - performance in excess of expectations based on measured ability - indicates that an inevitable or necessary ceiling on performance is not dictated by ability levels... The assumption that a level of performance is an inevitable predicate of a level of ability renders underachievement mysterious and overachievement miraculous. The terms which refer to discrepant achievement are therefore highly relative... the actual determinants of performance are complex and multiple; and the best single predictor of school performance - intelligence - does not thereby constitute the best explanation of it. So called discrepant achievement will therefore be explained in terms which reflect this complexity and multiplicity, if it is ever to be explained at all".

Underachievement therefore must be explained not only in terms of intelligence but also in terms of many other variables. Poor mental health, under which heading we can count among others inappropriate educational and vocational goals, lack of confidence, poor peer adjustment, fears, and unhealthy parent - child relationships, is known to be one of these variables. The present study takes intelligence as a main factor in predicting achievement and attempts to work out the importance of certain other factors.

B. CRITERIA FOR READING AND ARITHMETIC UNDERACHIEVEMENT

(1) READING

GAUDRY and SPIELBERGER (1971) concluded in their overview of the interactive effects of intelligence and anxiety that any research in this area must take intellectual ability into account. This conclusion is extended to all the variables in this research.

A glance at either MORROW (1969) who has collated, or GUNDERSON (1969) who has glossarized the terms used in describing backwardness and retardation leaves no room for doubt that the area is rich in what might be termed semantic minutiae. Methods of quantification while not being quite so variegated are nevertheless somewhat numerous.

PILLINER and REID (1972) concisely describe three methods of measuring backwardness. It can be measured as the simple difference between chronological and reading age; or in terms of reading quotient - the ratio of reading age to chronological age; or again in terms of a standardized reading score in which "the raw scores on the reading test of all children of a fixed age in the reference group are in effect ranked, the ranks expressed as percentiles, and the percentiles in turn converted into standardized scores which are normally distributed about some mean with some standard deviation, both arbitrarily assigned..."(p.30). This latter method allows age to be accounted for in the standardization and is thus a more statistically sound method of measurement.

'Retardation' introduces the concept of mental capacity... "a potential indicated by ability is not being realised" NAYLOR (1972 p.19). Thus a child who is dull may be reading at a level below his chronological age, but commensurate with his level of intelligence, hence backward in terms of age, but not underachieving in terms of potential. Several methods of measurement are described by Pilliner and Reid. Retardation can be measured in terms of the difference between mental age and reading age; secondly in terms of an achievement quotient: the ratio of reading age to mental age times 100, devised by FRANZEN (1920) and popularized by BURT (1937) and SCHONELL (1942); thirdly as the difference between standardized scores in reading and intelligence. The use of all such procedures, Pilliner and Reid point out, implicitly assumes that reading ability and intellectual ability "ought" to correspond completely. YULE et al (1974) point out that a most serious statistical objection to the above methods of measurement "...stems from the 'regression effect': wherever the correlation between measures (such as mental age and reading age) is less than perfect, the children who are well above average on one measure will be less superior on the other and those well below average on the first measure will be less inferior on the second... The only satisfactory means of taking into account this regression effect when assessing over and under achievement is that provided by the regression equations". Accordingly regression equations are used in this research to predict reading and arithmetic ages. An account of the statistical techniques used throughout this study will be found in Chapter X111.

Sophisticated bivariate and multi-variate regression formulae have been derived, albeit "remarkably infrequently", (RUTTER et al 1970 p.35) by RAVENETTE (1961), FRANSELLA and GERVER (1965), SAVAGE and O'CONNOR (1966), YULE (1967) and YULE et al (1974). Of these the regression formulae presented by Fransella and Gerver were based on five hundred children tested at the Children's Department of the Maudsley Hospital - a clinic population perhaps not unlike the one sampled here. However, it appeared to the writer that Fransella and Gerver's paper contained insufficient data to allow for a generalization to be made from the Maudsley to the present sample. Furthermore since a median split at 9.4 years was used to divide the older from the younger children this did not accord with the age-groups of the published equations. Therefore two regression equations - one for the younger children, one for the older children - were derived from the sample data. (All raw data are presented in Appendix 11 pp. A10-A20)

The median age of the 189<sup>(1)</sup> boys and girls was found to be 9.45 years; 95 children being in the younger group and 94 in the older. Since PILLNER and REID (1972) had commented that "The verdict of the intelligence test should be treated with caution... particularly when the intelligence test contains items liable to reflect weaknesses in, for instance, spacial perceptions or auditory memory" (p.35), and since FRANSELLA and GERVER (1965) had found that the W.I.S.C. verbal I.Q. appeared to be a more accurate predictor variable than the W.I.S.C. Full Scale I.Q. the predictor variables used were the W.I.S.C. Verbal Scale I.Q. and chronological age (i.e. the same as used by Fransella and Gerver), the dependent variable being reading age obtained from the Schonell reading test thus:-

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(1) When the younger children were divided into younger boys and girls groups it was discovered there were only 21 girls. A further ten girls under 9.4 years were then added to the study and predicted reading ages were calculated from the relevant equation below.

Full Scale I.Q. the predictor variables used were the W.I.S.C. Verbal Scale I.Q. and chronological age (i.e. the same as used by Fransella and Gerver), the dependent variable being reading age obtained from the Schonell reading test thus:-

$$Y = b_1 X_1 + b_2 X_2 + K$$

where  $Y$  = obtained reading age

$X_1$  = chronological age

$X_2$  = W.I.S.C. Verbal I.Q.

$b_1$  and  $b_2$  = partial regression coefficients  
and  $K$  = a constant (see Chapter X111)

Computations of this equation for older and younger children are in Appendix 111 (pp. A21 -A22).

From these computations the formulae for predicting reading scores were derived:-

(1) for younger children

$$\hat{Y} = -3.25854 + .731523.C.A. + .0471355.I.Q.$$

(2) for older children

$$\hat{Y} = -7.09152 + .744983.C.A. + .0864209.I.Q.$$

A predicted reading score, and the difference between the predicted and the obtained reading score, and a residual (Difference/S.E.) were computed for each child (Appendix IV pp. A23 -A30). Fransella and Gerver's level of significance was not used as a criterion as only seven younger and three older children's differences had a critical ratio significant at the .05 level. Accordingly the arbitrary decision (PILLINER and REID 1972 p.34) was made that those whose obtained reading age was below the predicted reading age would be termed, for the purpose of this research, "underachieving", the others "achieving".

However, this criterion was thought to be too gross and reading achievement was finally divided into three categories or levels: underachievement, normal achievement, and high achievement. 'Normals' in the case of the larger groups, the boys groups, were defined as those whose obtained R.A. - predicted R.A. /S.E. lies between  $\pm .848$ , i.e. the .4 level of probability in the 't' distribution (FISHER and YATES 1957) and 'underachievers' and 'high achievers' were defined as those lying on either side of these points respectively. The .4 level of probability was chosen arbitrarily to give a workable distribution for a 3 x 2 chi-square. In the case of the two girls' groups, numbers were too small to allow this and here the triple categorization was obtained by taking the top, middle and bottom thirds of the residual. Where cell expectancies are less than 5, a 2 x 2 contingency table was drawn up using only the top and bottom thirds, and Fisher's test of significance was applied.

## (2) ARITHMETIC

The basic difficulty in finding a suitable instrument to measure arithmetic attainment lay in the school situation itself. The children in this study are not confined to one Education Authority but are spread over four Authorities. For half a decade before this study began great differences in teaching arithmetic were to be seen not simply within the same education area but even within the same school. For example while some schools spent many hours in teaching how to convert shillings and pence into decimal currency,

others did not mention this subject. More importantly, while a number of schools had changed their teaching techniques to those more appropriate to the New Maths other schools had not, and even within the same school traditional and new approaches were being used in different classrooms. The writer had conversations with members of the Primary Education and the Mathematics departments of Notre Dame College of Education in which the staff made it clear that these same differential conditions still applied in some schools covered in this study as late as March 1974. A report in the Sunday Times (October 1974) showed how widespread were different classroom approaches in Leicestershire.

Therefore in 1969 when information for this research was first being collected it was felt that if arithmetic were to be tested at all the only fair test would be one of basic arithmetic, and the Burt Four Rules test was used. This deals with the basic mechanical processes of addition, subtraction, multiplication and division. However as the testing proceeded it was discovered that a large number of children, regardless of age and sex,<sup>(2)</sup> appeared unable to do the multiplication and division items. Eventually the testing of arithmetic was discontinued on the grounds that a common complete test could not be given to all the children. It was later decided, however, to include such arithmetic results as there were in addition and subtraction as a subsidiary to the reading research.

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(2) For a discussion on the differential effects of age and sex on the different mechanical process see BURT (1962) page 398.

The addition and subtraction scores of each of forty four Younger Boys, twenty two Younger Girls, forty two Older Boys and twenty eight Older Girls were converted to age scores by the normal method, added together and divided by 2 to give the arithmetic attainment score used here (Appendix 11 p.A10-A18). Predictor variables of chronological age and W.I.S.C. Verbal I.Q. and a dependent variable - the arithmetic attainment score - were used to compute a regression such that

$Y$  = obtained arithmetic score

$X_1$  = chronological age

$X_2$  = W.I.S.C. Verbal I.Q.

$b_1$  and  $b_2$  = partial regression coefficients

and  $k$  = a constant.

From this the following regression formulae for predicting arithmetic scores were derived (Appendix V p.A31-A32):-

(1) For younger children

$$\hat{Y} = - 10.8090 + 1.30358.C.A. + .06067.I.Q.$$

(2) For older children.

$$\hat{Y} = - 2.12595 + .505599.C.A. + .05145.I.Q.$$

From these formulae the predicted arithmetic scores were computed (Appendix V1 pp.A33-A38). The same categories of underachievers, normal achievers, and high achievers were used in defining levels of arithmetic achievement as were used for defining levels of reading achievement.

The Standard Error of Estimate (S.E. Est.) in each age group for both reading and arithmetic is high, (Appendix V and VI), therefore the predicted score is the most probable score over a wide range of possible scores ( $Y \pm 1.96$  S.E. Est)

In every case however the S.E. Est. is lower than that reported by Fransella and Gerver<sup>(4)</sup>:-

TABLE 2

S.E. Est. FOR READING PREDICTION IN FRANSELLA AND GERVER'S PAPER AND THAT FOR READING AND ARITHMETIC PREDICTION HERE.

Source	Age (yrs)	S.E. Est.
F and G	6.2 - 9	1.90
Here	7 - 9.4 (Rdg)	1.43
	7 - 9.4 (Arith)	1.3
F and G	10 - 12	2.24
Here	9.5 - 12 (Rdg)	1.43
	9.5 - 12 (Arith)	1.5

(4) Here too, as with Fransella and Gerver, the correlation of R.A. with I.Q. increases with increases in C.A. (Appendix 111).

CHAPTER  $\bar{X}$

THE SOURCE OF THE PSYCHOLOGICAL DATA.

Five well-known tests were used:-

- (i) the Weschler Intelligence Scale for Children (W.I.S.C.) (WESCHLER 1949);
- (ii) the Schonell Word Reading Test R1 (SCHONELL and SCHONELL 1960);
- (iii) the Burt Four Rules Test (BURT 1962);
- ( iv) the Junior Eysenck Personality Inventory (S.EYSENCK 1965);
- and ( v) the Bender Gestalt Test (Koppitz norms - (KOPPITZ 1964).

In addition the Stanford-Binet Intelligence Scale (1961) was taken as a criterion in some cases. Where the child had originally been tested on the Binet and his I.Q. was above 80 then the W.I.S.C. Verbal I.Q. was calculated and used in the computation of the regression equation already discussed concerning criteria of underachievement.

(i) THE WESCHLER INTELLIGENCE SCALE FOR CHILDREN (W.I.S.C.)

This test is perhaps the most satisfactory test of general intelligence available for school age children. Basically, it consists of ten sub-tests five of them verbal in content and five of them non-verbal, from which are derived three scores - a Verbal I.Q., a non-verbal or Performance I.Q., and a Full Scale I.Q.

Split half reliability coefficients for the three scores are as follows:-

TABLE 3

SPLIT-HALF RELIABILITY COEFFICIENTS FOR W.I.S.C  
FULL, VERBAL, AND PERFORMANCE SCALES.

Age	Full Scale	Verbal Scale	Performance Scale
7½	.92	.88	.86
10½	.95	.96	.89
13½	.94	.96	.90

Adapted from Anastasi 1961 p.317.

Anastasi (1961 p.317) writes

"A different picture is presented by the sub-test reliabilities. A few of these coefficients are in the .50's. Most are evenly distributed in the .60's, .70's, and .80's. Only one test, vocabulary, yielded any coefficients in the .90's and even this test had a reliability of only .77 in the 7½ year group. It might be added that most of the subtests had lower reliability coefficients in the youngest age group than in the other two groups. The test manual rightly cautions the users of this scale against interpreting differences between sub-test scores without due reference to the reliability coefficients of the particular sub-tests".

She cites a four year follow up study by GEHLMAN and MATYAS (1956) indicating that W.I.S.C. I.Q.'s are about as stable (about .77) as Stanford Binet I.Q.'s over the same interval.

Anastasi reports that not much has been done in the field of validity. A number of studies reviewed by LITTELL (1960) have shown high coefficients between W.I.S.C. and achievement tests and other academic criteria of intelligence. As expected the Verbal Scale had a higher correlation with academic criteria than the Performance Scale on such criteria.

Varying with age, correlations between W.I.S.C. and Stanford - Binet have ranged between the .60's and the .90's. The Verbal Scale correlates more highly with the Stanford-Binet than does the Performance Scale - not surprisingly as MCNEMAR (1942) had shown that in general Stanford Binet I.Q. performance was explainable in terms of a single common factor - verbal ability "...normal and superior children," writes Anastasi, "tend to score higher on the Stanford-Binet than on W.I.S.C. The discrepancy in favour of the Binet is greater for brighter and younger subjects. For mentally retarded the W.I.S.C. yields a significantly higher mean I.Q. than the Binet"<sup>(1)</sup> (pp. 319-320).

(ii) SCHONELL'S GRADED WORD READING TEST (Appendix VII p.A39)

This is a word recognition test consisting of one hundred words beginning with simple words - 'tree', 'little' 'milk', and gradually increasing in difficulty - 'somnambulist', 'bibliography' and idiosyncrasy'. Size of print decreases approximately as reading level progresses. The words appear not to have any special connexion with any particular method of reading teaching and appear to be equally useful in testing children who have learned reading by look-and-say, whole sentence, phonic, or combined methods.

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(1) Unfortunately Anastasi does not give any references for this last sentence. The writer has tested about eighty mentally handicapped children and found that in almost every case where data was available the I.Q. yielded by the Binet was slightly higher than that yielded by W.I.S.C.

THACKRAY (1971) notes that the standardization and validation are not fully accepted by today's standards. He quotes GEORGIADES (1968)

"The test was standardized on a sample of 60 children per year in the age range 5 - 15. The one hundred words used were selected from 300 words, the source of which is not indicated, and for a word to be included, it was necessary that 55% of the children, aged 5 years, got the easiest word correct and 48% of those aged 14 - 15, the more difficult. This means that only 33 children had to respond correctly to the easier words for them to be included in this test. No indication was found of the areas from which the standardization sample had been drawn, no coefficients of reliability or validity are given, although the test itself does have a considerable amount of face validity". (THACKRAY 1971 pp.152-153).

Nevertheless the test is used in this research as it provides an accurate estimate by which comparison may be made between pupils' powers of word recognition.<sup>(2)</sup>

Reading ages between five and fifteen years can be calculated from raw scores and these ages recorded in decimalized form. The scoring system recorded in the manual (SCHONELL and SCHONELL 1960 p.41) is used here.

(iii) THE BURT FOUR FUNDAMENTAL RULES (Appendix V111 pp. A40 - A41).

This tests the child's speed and accuracy on mechanical arithmetic in the four areas of addition, subtraction, multiplication and division. Five minutes are allowed for each rule which is to be worked on a separate sheet. There are sufficient examples to occupy the quickest of children for the whole of the time. In this study, as was explained in Chapter 1X, only the addition and subtraction tests were used.

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(2) The BULLOCK REPORT 1975 (p.251) states that the Schonell test was used in 84% of the largest schools in their sample.

BURT (1962 p.397f) writes that the two principles underlying the construction of this test are (1) that all available figures and all available combination of figures, taken in pairs, should be used as far as possible with equal frequency; and (2) that each figure and each pair should be scattered over the paper in chance order, thus level of difficulty becomes on the whole equal throughout the paper.

His intention had been originally to mark the papers for accuracy and then for speed. However marked for accuracy alone the papers seldom give a reliability coefficient above .35 which is in general a little over half that when marked for speed. He does add, though, that when estimating the accuracy of a class, or an age group as a body, as distinct from the accuracy of the component individuals, a single test paper will ordinarily give "reasonably secure" results.

The norms, published in Tables LI to LIV of BURT (1962), are norms for an amalgamation of speed and accuracy into a single measure.

(iv) THE JUNIOR EYSENCK PERSONALITY INVENTORY (Appendix IX pp.A42-A43).

This measures two personality dimensions - stability - neuroticism, and introversion - extraversion. It is a downward extension of the Eysenck Personality Inventory (EYSENCK 1964a) containing sixty questions. Twenty four are for stability - neuroticism (Neuroticism scale), twenty four for introversion - extraversion (Extraversion scale), and the remaining twelve constitute a Lie Scale. It is presented to children between seven and sixteen years of age and there are separate norms for boys and girls standardized on over 6,000 children.

The inventory is based on the theory that many behavioural traits are intercorrelated in such a way as shown on the following chart adapted from S.B.G. EYSENCK (1965 p.4):-

<u>UNSTABLE</u>			
Moody		Touchy	
Anxious		Restless	
Rigid		Aggressive	
Sober		Excitable	
Pessimistic		Changeable	
Reserved	<u>Melancholic</u>	<u>Choleric</u>	Impulsive
Unsociable			Optimistic
Quiet			Active
<u>INTROVERTED</u>		<u>EXTRAVERTED.</u>	
Passive		Sociable	
Careful		Outgoing	
Thoughtful	<u>Phlegmatic</u>	<u>Sanguine</u>	Talkative
Peaceful			Responsive
Controlled		Easygoing	
Reliable		Lively	
Even-tempered		Carefree	
Calm		Leadership	
STABLE			

This chart may also be used to indicate the nature of the two factors involved i.e. extraversion is characterized by sociability, activity, optimism, and impulsive behaviour, while introversion is characterized

by passivity, thoughtfulness and reserved behaviour. Similarly with respect to neuroticism the unstable person is moody, touchy, anxious, and rigid, while the stable person is calm, carefree, and reliable.

The inventory, which has been used extensively in educational research, does not assume that everybody will be extravert or introvert, stable or neurotic; people are found at intermediate stages. Each child's scores are compared with the standardized norms published in the manual (S.B.G. EYSENCK 1965). The scores are placed in one of four categories:-

1. (Melancholic) High N and Low E score
2. (Phlegmatic) Low N and Low E score
3. (Choleric) High N and High E score
4. (Sanguine) Low N and High E score

Average Neuroticism and Extraversion scores denote normality for each child by age and sex.

One hundred and eight items were originally administered to school children in Rotherham and London. A lie scale of sixteen items was also constructed and given to a further set of school children not previously tested. On the basis of a factor analysis sixty suitable items constituted the final inventory. The choice was based on the loadings of the items for their respective factors, and their lack of loading on other factors. There is a slight negative and insignificant correlation between Neuroticism and Extraversion.

This test was standardized mainly on Rotherham and a few London children. The two sets of data are combined in the manual under the heading "final norms".

There is a marked increase by age for Extraversion among boys, but not so marked among girls. There is a clear increase for Neuroticism girls, but no increase for boys. Lying consistently decreases with age for both boys and girls.

Split half reliabilities for Extraversion range from .581 to .864 for boys and from .633 to .868 for girls; for Neuroticism they range from .785 to .847 for boys, and from .802 to .891 for girls; and for the Lie Scale from .607 to .799 for boys, and from .409 to .767 for girls. There is no great change with age as far as Neuroticism is concerned but a considerable increase in reliability with age as far as Extraversion is concerned. With the Lie Scale the slight increase is of no practical significance. Test - re-test reliabilities were obtained after a time lapse of one month on over one thousand boys and over one thousand girls. These are of the order of .7 and .8 and tend to increase with age for Extraversion, a little less so for Neuroticism, and there is no obvious progression for the Lie Scale.

Correlations between Neuroticism and Extraversion are, overall, about - .15, again insignificant. The slight negative correlation between Extraversion and the Lie Scale for older children may be interpreted as either showing a slight tendency for introverts to lie more, or a slight tendency for introverts to be better behaved. Children with high Lie scores tend to have low Neuroticism scores, possibly due to conscious attempts at faking.

The manual reports on a group of 229 child guidance clinic subjects and found this group as a whole to be very significantly above the standardization group with respect to Neuroticism and that there was a very significant difference with respect to Extraversion between children showing extraverted symptoms and those showing introverted symptoms - though the data are not reported. Appendix X (pp.A44 - A46) shows the means and standard deviations for the children in this study by age and sex.

Here/

too these clinic children, like those reported by Eysenck, appear to be significantly above the standardization group with respect to Neuroticism. Eight and nine year old boys and eight year old girls are higher at the .01 level, while eleven year old girls are higher at the .05 level. Again while there is no significant difference between the girls in this study and those of the standardization group vis-a-vis Extraversion, the ten and eleven year old boys appear to be lower in Extraversion at the .01 level, and eight year old boys are lower at the .05 level.

The manual reports that there is no evidence of any correlation between Extraversion and I.Q., but there is a slight negative non-significant correlation between Neuroticism and I.Q.

In this study correlations between Neuroticism and Extraversion in the larger (reading) groups range from  $-.117$  to  $.053$  (Appendix XV111 p.A80 and p.A82), and for the brain-injured  $.298$  (Appendix XV111 p. A96), no group reaching significance. The correlation between Neuroticism and I.Q. ranges from  $-.307$  to  $.083$  (Appendix XV111 p. A80 and p.A82), and for the brain-injured  $-.155$  (Appendix XV111 p.A96), no group reaching significance. However the correlation between Extraversion and I.Q. reached significance ( $.05$ ) for the Older Girls. (Appendix XV111 p.A86)

(v) THE BENDER GESTALT TEST FOR YOUNG CHILDREN.

Nine simple figures (Appendix X1 p.A47) are presented individually on postcard size cards. The child is asked to copy each design with the sample before him. The figures were adapted by Bender from figures by

Wertheimer who had constructed them to illustrate certain principles of Gestalt psychology as related to visual perception. KOPPITZ (1964 p.1) explains that Bender points out the perception and reproduction of the Gestalt figures are determined by biological principles of sensory motor action and vary depending on a) the growth pattern and maturation level of an individual, and b) his pathological state either functionally or organically induced. Although administered for many years by psychologists to children and adults Bender did not provide an objective scoring system and WIGGINS (1973) emphasizing this lack of objectivity reports a study by GOLDBERG (1959) showing differences in interpretation among even experienced clinicians.

PASCAL and TUTTLE (1951) standardized and quantified the test on adults fifteen to fifty years old, of normal intelligence; but their norms are unreliable for children under nine years. Koppitz, whose norms are used in this research, constructed a developmental scoring system by collecting normative data from the Bender records of 1104 school children aged five to ten years. The scoring system was then applied to the Bender protocols of groups of children including those with emotional problems, brain injury, learning difficulties, and mental retardation, and a second scoring system was developed to measure emotional adjustment.

Of the developmental scoring system Koppitz writes (pp.33-35)

"...the Bender mean scores for both boys and girls decrease steadily between the ages of 5 and 9 years thus reflecting the effect of maturation on visual-motor perception. At age 9 most children are able to execute the Bender Test without serious errors. Up to age 8, the Bender Test discriminates between those who are above average and those below average on test performance. After<sup>8</sup>8, a Bender score of 0 or the absence of errors indicates nothing more than that the child's visual-motor perception is within the normal range for his age group. For children 7 years old and younger the Bender Test is useful for the identification of both immature and bright youngsters; for children 8 years old or older the Bender Test can only screen out those with immature or malfunctioning visual-motor perception.

At ages 5 and 7 girls appear to mature a little earlier than boys in visual-motor perception. However, at no age level were the differences between the Bender mean scores for boys and girls statistically significant".

#### The Bender as a test for diagnosing brain injury.

There appears general acceptance that this test is a valuable aid in diagnosing neurological impairment. Investigators, as Koppitz reports (p.71), agree that the Bender protocols of brain-injured individuals can be differentiated from those of the non brain-injured who are not psychiatric patients, and that the brain-injured individuals' records display more immature and more primitive features. Koppitz reviewed the literature and noted there were deviations in the protocols which related to a) permanent brain-injury-rotation, perseveration, distortion, fragmentation, poor integration, substitution of lines for dots, and difficulty in the correct angular placing of certain parts; and b) temporary brain diseases or acute confusional states regardless of aetiology. She warns however(p81):

"... it should be emphasized that the presence of diagnostically significant indicators for brain injury is not sufficient by itself to make a definite diagnosis of neurological impairment. Such indicators offer strong hypotheses that brain injury may be present, but all Bender deviations can and do occur with more or less frequency on the records of supposedly non brain-injured children at some level of maturation.

The validity of a diagnosis of brain injury is greatly enhanced when a Bender record is examined for both the total Bender score and for individual scoring items which are associated with neurological impairment. The presence of indicators of brain injury on a Bender record may serve as a valuable clue in differentiating among children with poor Bender scores. A poor total Bender score and the presence of several indicators of brain-injury may suggest that the child is neurologically impaired, while an equally poor Bender score with a minimum of organic indicators may suggest that the child is slow maturing but does not have any malfunctioning in visual-motor perception".

In this study, therefore, the term "brain injured" refers to what is identified as such by the Bender-Gestalt test. That is, the criterion as such is not neurological impairment per se but the test itself. REED, RABE, and MANKINEN(1970) discuss at length the problems in identifying the brain-injured child stressing that although psychological tests can be used to describe the ability deficits, and the emotional and perceptual characteristics of children with brain-damage, there must also be evidence independent of the psychological tests for the fact of damage. They offer the following critique concerning the over worked use of the term "brain-damage".

"Unfortunately, signs of neurological dysfunction associated with reading problems in children are either absent or when present are not examples of classical neurology. Instead the signs are those of mild brain dysfunction. These signs are so difficult to classify that they have been the subject of several national task forces which have undertaken to define and describe their existence under the heading of the syndrome of minimal brain dysfunction (Clements, 1966, Task Force 11 Report 1969). As presently understood the syndrome consists of children with near average, average, or above average intelligence who present learning and/or behavior disabilities associated with deviations of function of the central nervous system. These deviations are manifested by various combinations of impairment of perception, conceptualization, memory, language, motor coordination, and control of attention and impulse. The neurological signs of this syndrome are highly variable and include some combination of the following: abnormalities of eye movement, head-eye dissociation, articulation, alternating supination and pronation of the extended arms and hands, serial apposition of fingers, heel-shin tapping, walking on heels and toes, hopping on one foot, and tandem walking. In addition, short attention span, easy distractability, and difficulties with visual-motor tasks can be found. These disabilities have several qualities; first, they are often classifiable as disabilities only when compared with a rough age dependent standard, i.e. the seven-year old may perform like a four or five-year old; second, as the child grows older, abilities to perform tests of integration of movement improve; third, there is no known brain pathology associated with these aberrations and none can be implied by correlation with knowledge of 'classical' neurology; and finally, some children have behavior or learning disabilities without these signs and some children with poor performance in the motor tests have no clear learning or behaviour abnormalities.

Although the syndrome has been carefully defined as that of minimal brain dysfunction (MBD) it is an habitual tendency to regard these children as having brain damage despite the lack of evidence for structural damage. This is done because of an uncritical tendency to equate poor psycho-motor function with a damaged brain". (pp. 384-5).

In this study the need for such independent neurological criteria advocated by Reed, Rabe, and Mankinen is not met. Further evidence that the thirty-four "brain-injured" children here are not what these authors term truly brain damaged can be seen from an examination of the group's mean I.Q. The authors state "It is very difficult to compose a group of brain-damaged children where the mean I.Q. will fall well into the average range for the general population" (p.384), Here the mean - 98 (S.D. = 13.3) (Appendix XV111 p.A96) does fall within the average range.

While heedfull of Reed et al's warning on nomenclature, the term "brain-injured" is used throughout this study in Koppitz' sense.

Appendix X11 (p. A48) illustrates the writer's scoring of a Bender protocol, and Appendix X111 (pp.A49-51) gives the full Bender protocol records of the thirty four children comprising the Brain-injured Group in this study.

CHAPTER XI

THE SOURCE OF THE DATA CONCERNING PARENTAL  
ATTITUDES.

While PETERSON et al (1961) have noted the lack of a questionnaire designed to measure the attitudes of fathers towards children, though such attitudes have been shown (ANDRY 1960, ERON et al 1961) to be of importance, there are several instruments which measure the mother's attitude.

An early American form - the Fels Parent Behavior Rating Scale had thirty-one rating scales which made practicality very difficult.

The Parental Attitude Research Instrument (P.A.R.I.) - for mothers - was constructed by psychologists in the Child Development Section of the National Institute of Mental Health (SCHAEFFER and BELL 1958).

It yields three major factors:-

- A. Authoritarian - control - measuring authoritarian and restrictive attitudes;
- B. hostility - rejection - measuring not only hostility to the child but also rejection of the maternal role, and of the husband;
- and C. democratic attitudes.

This same institute produced a "Trial form of the PARI for fathers" but little appears to have been done with this.

Oppenheim's Parent Attitude Inventory, designed for use with mothers of six to twelve year olds deals with ten scales which reduce to two major factors

- A. Democracy - Autocracy, and B. Acceptance.

The development of a technique to categorize parents' attitudes towards their children.

As a precondition of this research the clinic's Director had deemed it undesirable to make any direct approach whatsoever to the parents concerning their attitudes towards their children. Questionnaires, therefore, such as those mentioned above could not be used. This precondition was not, however, regarded as in any way stifling to the research - rather the opposite. The classical method of categorizing attitudes is the interrogation of the mother (at times the father) through interview or inventory. YARROW (1963) says that stripped of all elaborations these are "self descriptions by extremely ego-involved reporters. In addition ... these are self reports in an area in which prescriptions and taboos have been dinned into the culture through the 'Ladies Home Journal' as well as Spock or Gesell".<sup>(1)</sup> In this connexion the writer remembers the vivid description given him by one of the psychiatric social workers of a first and joint interview with the father and mother. The mother and social worker had reached the close rapport only occasionally possible at this first interview where intense emotional feelings are involved; the father was still however hesitatingly out in the cold. Mother poured out information concerning her handling of the child while father, apparently realizing this handling was not quite "by the book", spent an agonising period trying to catch his wife's attention and halt what was, in his eyes, a self-condemnatory torrent by coughing, shuffling and glaring at her.

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(1) That Spock and Gesell may not have permeated fully the American Consciousness is well outlined in a depressing article by BRONFENBRENNER (1974) delineating the not-so-gradual changes in family life leading to estrangement between children and adults - which estrangement is described as a root cause of behaviour and achievement problems.

Two approaches were made to categorize parents' attitudes towards their children. The first proved somewhat abortive.

A. The first attempt at categorizing parental attitudes.

One hundred and fifty five actual statements of mothers' attitudes towards their children such as "Mother gives more affection to this child than to his sibs", and "Mother smacks child when he breaks into her conversation" were abstracted from over seventy case histories which had been chosen at random. These statements were arranged into "A Questionnaire to Categorize Mothers' Attitudes Towards Children" (Appendix XIV pp.A52-A59). Instructions and directions were given requiring the clinic's social workers and forty-three others - teachers, psychologists, parents and social workers - to categorize each of the statements into one of five attitudes. These were the four attitudes described by KENT and DAVIS (1957) - "Unconcerned", "Normal", "Demanding", and "Overanxious" - and a fifth "Hostile" added by the writer. It was hoped that by comparing the replies, those statements on which there was a large degree of agreement would be retained and, Likert - like, used to form a questionnaire to be filled in by the clinic's social workers with reference to the parents of the children in this study. The other statements would be discarded.

Most of these questionnaires were completed and returned but the comments made in discussion by the clinic's social workers showed how united they were concerning the ineptness of the application of such a procedure. Their strongly expressed and unanimous feeling centred round what may be termed the "unreality" of the situation. For example statement 130, "Mother and child do things together (wash dishes/make beds)"

might usually be taken as a "Normal" attitude of mother to child. However the mother might be present to see that everything the child does is perfect - a "Demanding" attitude; or she may be afraid that the child does something wrong - perhaps an "Overanxious" attitude. Again statement 133, "Mother leaves children at home alone" may indicate an "Unconcerned" or "Hostile" or "Normal" attitude depending on the circumstances. This last phrase is the key - it was felt impossible to categorize the statements in this questionnaire in a meaningful or truthful manner when they are divorced from context. What may be a hostile attitude in one set of circumstances may well be normal in another.

The social workers made a second objection - the five attitudes were too mutually exclusive of one another. This is cognate with the first objection which concerns the differences of interpretation between different households - this second one concerns differences of interpretation within the same household. For example statement 9, "Parents ignore any friends the child might bring home", - any given mother might ignore these friends through unconcern one day, but the next day it might be through hostility.

Therefore at this stage this approach was abandoned and a more global one which would enable the social workers to make full use of certain assets was formulated.

B. The final approach to categorizing parental attitudes.

Mindful that categories are at once too inclusive and too exclusive of factors bearing upon parental attitudes (for this latter reason one social worker declined to take any further part in this

research<sup>(2)</sup> a second approach was made based on global observation.<sup>(3)</sup> A number of observational techniques were used in combination.<sup>(4)</sup>

The social workers in the present study had many and frequent interviews with the parent (either mother, or father, or both together); they were also able to observe parent-child interaction

(1) whenever the child accompanied the parent(s) to any of the interviews;

(2) during informal meetings with parent(s) and child on the stairs, in the hallway, waiting-room and playrooms of the clinic;

and at times (3) in visits to the home.

They were also in close touch both with the play therapists who frequently see the parent(s) and child interact in informal situations, and with the psychiatrists

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(2) This lady had had at that time some thirty-four years experience of psychiatric social work both in Scotland and U.S.A. While she appreciated the motives behind this study she could not "in conscience categorize parents in any way". She felt throughout her professional career that the ongoing relationship between herself and a parent was a constantly changing one. This did not simply relate to the parent qua person, or to her rapport with the parent; it allowed her to make quite different interpretations of essentially the same body of information concerning the parent before he/she had become a client. This raises the question of how involved can the social worker allow himself to be in a family case he is treating. Should he draw a hard and fast line between objective and subjective assessment? An interpretation of LAING and ESTERSON (1964) working in another but similar field might be that he should not.

(3) For an apologia for the use of observational techniques see HUTT and HUTT 1970 pp. 197ff.

(4) LYTTON (1971) has listed a hierarchy of observational techniques which range from those furthest removed from the observation of normal parent-child interaction to those most closely involved with it - from paper and pencil techniques through varying structured methods to the totally unstructured normal situations. He listed four methods discounting questionnaires:-

- a) an interview with the parents;
- b) observation of a structured parent-child interaction in the laboratory;
- c) observation of an unstructured parent-child interaction in the laboratory;

and, d) naturalistic observation in the home.

who saw this interaction in the more structured situation as described by STONE and KOUPERNIK (1974). A further, and very valuable, source of information is to be found among the administrative staff, in whose presence parents tend, at times, to drop any "social desirability set" they may have retained before the professional workers.

The attitudinal data obtained in this study appears to approximate BAUMRIND'S (1968) criteria for veracity,<sup>(5)</sup> since it may be claimed, with more than slight justification, that the clinic as a whole functions as an observational base reporting extended summary variables to the social workers from a variety of situations. The validity of the data may be assessed also from the fact that the social workers were reporting not on short term observations, as JONES (1972), but on observations in many cases stretching over a year or longer. Short term observations some consisting of a single interview, are inadequate.<sup>(6)</sup>

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(5) Although BELL (1964) commenting upon the effects of structuring situations says "Two general effects may result from minimal restrictions of parent or child behaviour in the observation situation: behaviour may 'pile up' in a small number of categories as a result of events occurring in a particular session... leaving the situation unstructured would act only to build up very high frequencies in categories... and behaviour of the parent and child is distributed across a large number of categories, such that many categories have only a small number of occurrences represented or none at all"; nevertheless BAUMRIND (1968) points out that the advantage of a rigorous control of stimuli, as effected by the structured situation, is illusory since the validity of the data obtained in this manner is doubtful if generalized to the natural situation in which the child grows up and is socialized.

(6) STONE and KOUPERNIK (1974) write of the preliminary reporting back interview, that is given after the assessment interviews, that it "frequently becomes the occasion for the first uninhibited discharge of parental fear and guilt, and the establishment of a relationship of trust with the clinician" (p.39)

In this second approach the method of recording behaviour, as it came from its various sources to the "clearing house" of the social worker, is not that of the narrative summary nor is it precoded behaviour categorization; but as may be expected from the nature of the sources, it is one of rating after observation; the actual molar behaviour was not noted but a rating was made on the global characteristics of parent-child interaction. Though LYTTON (1971) criticises this method as involving the greatest amount of abstraction he writes (1973) "In fact, the rater may overcome some of the fragmentation inherent in straight behaviour counts and, by giving weight to some subtle and unique cues, may be able to bring out a quality and unity in the subject's behaviour that the count is unable to reveal". Further, from the aetiological point of view STONE and KOUERNIK (1974) write "we attach greater weight to the continuing day to day impact of a disturbed pattern of interpersonal relationships... we place the emphasis more on the impact of continuing relationship dissonances than on the fortuitous 'traumatic episode'". (p.25)<sup>(7)</sup>

This type of observation and recording is such, however, that it may be argued that a "recency effect" might cloud the issue. It was, therefore, pointed out and reiterated to the social workers that they were not to categorize the current attitude but the parental attitude as it had been at the commencement of treatment.

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(7) One eight year old client of the writer had fallen from a roof and had received severe head injuries. For several years afterwards the mother continued to blame this fall for the change in behaviour in the boy. "He never did anything wrong before that," she would say. "Now I can't get him to do anything he's told". She had, perhaps conveniently, forgotten the fall was caused by an act of disobedience.

This temporal point was clearly understood and afforded no difficulty at all, as it was a point stressed in the training within their own discipline.<sup>(8)</sup>

Three difficulties remain in this approach... (1) inter-judge reliability, (2) given such reliability, do the opinions of these judges as a group approximate the opinions of judges drawn from cognate groups? and (3) it appeared, in view of the discussion with the social workers previously referred to, that to ask directly for ratings on a two - fold classification of Accepting - Rejecting attitudes based on the Nurse syndromes, would again invite, from the judges' point of view at least, too exclusive - inclusive a categorization.

A model was devised based on the categories of parental attitudes analyzed by BALDWIN et al (1945) at the Fels Institute (and recently used as a groundwork by LYTTON 1968). This technique necessarily involves a certain danger of invalidity by projecting results

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(8) SHANNON (1974) writes in an overview of attitude change: "Attitudes are capable of change. The phenomenon of change of attitude was explained by Osgood and Tannenbaum (1955). They advanced the idea that 'all or nothing', 'black or white' judgements are simpler than refined ones. Values tend to move towards extremes. There is a pressure towards polarization. Along with the idea of 'polarity' they suggested the idea of movement in the direction of 'congruity' that is in the direction of the prevailing frame of reference" (pp.37-38). The clinic frame of reference might therefore cause a movement (the writer thinks it usually does), in the parents' attitudes in the direction of those attitudes projected by the clinic. In his own research, on the development of the personality of student teachers and their attitudes to teaching, Shannon demonstrated a very significant movement, in a positive and approving direction, of student teachers' attitudes towards Educational Psychology over a period of two years.

gained in an unreal situation to a real life situation.<sup>(9)</sup> Nevertheless, three case histories (the unreal situation) were adapted from Baldwin et al's monograph and distributed along with definitions of each of seven categories of parental attitude (Appendix XV pp.A60-A67) to fifty three persons including the five social workers (the eventual judges of the real life situation) at the clinic, and groups of related professions comprising psychologists, social workers, therapists and teachers employed either in Glasgow or its adjacent counties. All were asked to categorize each of the three cases into one of the seven categories.

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(9) In this study the assumption is made that because the judges' categorizations are identical in the unreal situation (Table 5), they will be identical or nearly so in the real situation i.e. in the case histories of the children being judged in this study. This, however, need not be correct since the information given in the hypothesized cases may have such a structure as to lead the judges (and the related professionals) towards the same categorizations, (Osgood and Tannenbaum's frame of reference being at work), whereas real cases being much wider may lead to much different categorizations by the same people. Nor does the finding that the judges' categorizations are identical dispel the doubts cast on this method by COOPER et al (1974) when they say that "... high agreement between observers may not mean that they have eliminated their bias: they may simply all have been trained to have the same bias". This point was discussed with three social workers drawn from different training establishments - not the judges used here. They agreed that different establishments led them to emphasize different features of a given case. They added also that the approach used in this study was so global that Cooper's objection did not appear to apply. Nevertheless the writer feels that regardless of the different emphases of different establishments, the very globality of the present approach, if it is looked upon as a "smoothing over", may leave itself open to Cooper's objection particularly when, as here, the judges are working in the same closely knit clinic.

Since it was intended to condense the seven categories into two - Accepting and Rejecting - informal discussion was held, before the distribution of the protocols, with nine psychiatric social workers three of whom were from the clinic and six in Local Authority work. Following their recommendations a dichotomy was formed as follows:

Rejecting parents were those who would be categorized as

- (1) actively and thoroughly rejecting;
- (2) partially rejecting;
- and (3) authoritarian but casual.

Accepting parents were those who would be categorized as

- (4) casual and indulgent
- (5) accepting, indulgent, not democratic;
- (6) accepting, democratic, not indulgent;
- and (7) accepting, democratic, indulgent.

Category (4) "casual and indulgent" appeared somewhat ambiguous and its placing in the dichotomy caused most concern. It was felt however that it portrayed more of an accepting than a rejecting parental attitude.

Forty six of the fifty three protocols were returned and the following is a table of the replies received:-

TABLE 4

CATEGORIZATIONS OF THREE SAMPLE CASE HISTORIES

Category Number	Category of Attitude.	Hypothetical Case.		
		1	2	3
1.	Actively and thoroughly rejecting	0	0	0
2.	Partially rejecting	0	40	0
3.	Authoritarian but casual	5	3	5
4.	Casual and indulgent	6	3	4
5.	Accepting, indulgent, not - democratic	2	0	32
6.	Accepting, democratic, not indulgent	33	0	0
7.	Accepting, democratic, indulgent	0	0	5

Using the twofold classification the replies of the five judges alone were:-

TABLE 5

CLINIC JUDGES' CATEGORIZATIONS OF THREE SAMPLE  
CASE HISTORIES

Parental Attitude	Hypothetical Case		
	1	2	3
Rejecting	0	5	0
Accepting	5	0	5

The replies of the members of the related professions were:-

TABLE 6

RELATED PROFESSIONS' CATEGORIZATIONS OF THREE  
SAMPLE CASE HISTORIES

Parental Attitude	Hypothetical case.		
	1	2	3
Rejecting	5	38	5
Accepting	36	3	36

To discover whether or not there was a significant difference between the two groups (judges and related professions) 2 x 2 contingency tables were drawn up comprising

- 1) case histories 1 and 3 (identical frequencies),
- and 2) case history 2.

Since both these contingency tables have expected values below 5, chi-square would have been invalid, therefore the Fisher Exact Probability Test (SIEGEL 1956) was used where the exact probability of the observed occurrence is found by taking the ratio of the product of the factorials of the four marginal totals to the product of the cell frequencies multiplied by N factorial. Since in each table one of the cells contains a zero, no extended calculation nor Tocher's modification was necessary.

Case histories 1 and 3

	Related groups	Judges	
Rejecting	5	0	5
Accepting	36	5	41
	41	5	N = 46
P = .55			

Case History 2.

Related groups	Judges	
38	5	43
3	0	3
41	5	N=46
P= .70		

In all three hypothetical cases, therefore, there appears to be no significant difference between the two groups in their categorizations of the parental attitudes involved here.

An eye inspection of the intra judge replies (TABLE 5) shows them to be identical.

A check was used on the clinic judges' categorizations in this research. Two clinic play therapists were asked to rate, in the same manner as the judges, the parent-child interaction of those families known to them. Between them they rated 123 cases into the original seven categories; twenty nine of these showed differences from the judges but in every case they equated with the clinic judges' categorizations when these and the therapists' ratings were combined into the Accepting - Rejecting dichotomy. (Appendix XV1 pp. A68-A71)

Thus, as there appeared to be high intra-judge reliability; as the judges' categorizations did not differ from those of allied professional groups; since the judges had a close knowledge of the parents; and since a check was used - which proved successful - it appeared that it would be a justifiable technique to use the opinions of these five social workers (judges) to categorize parental attitudes. Therefore the second approach - the

judges' categorizing into seven attitudes and then forming a dichotomy of Accepting - Rejecting from the results - is used in this research.

The findings are recorded in Appendix 11 under the heading "Attit". Here 1 represents Acceptance, 0 represents Rejection.

CHAPTER X11

THE SOURCE OF THE DATA CONCERNING PARENTAL  
EMOTIONAL DISTURBANCE AND PERINATAL EMOTIONAL  
STRESS IN THE MOTHER.

Information about each of these was obtained in a similar way. Firstly, for each child, the psychiatrist's and the social worker's original reports - that is the reports each made before the initial case conference - were consulted. These reports comprised usually one clinical interview by the psychiatrist with the parent or parents alone, the child alone, and the parent(s) together with the child, and two or more interviews between the parent(s) and the social worker (Appendix I pp. A1-A9). The social worker's interview yielded for these purposes information on perinatal emotional distress, and occasionally certain pointers indicative of parental emotional disturbance were also reported. The psychiatrist's report covered similar ground though here the emphasis was more medical; and also since the psychiatrist had been primed by the social worker, he could look more specifically into areas of both family and individual disturbance.

However the reports at this stage - the stage of the initial conference - were rarely taken at face value because experience had taught that in order to obtain true information of this type a good and deep relationship had to exist between client and worker. STONE and KOUPERNIK (1974) maintain rightly that it is (in the majority of cases) only after these interviews had taken place, in the preliminary reporting back interview that the first relationship of trust is established. The possible exception to this is the type of case where the parent - usually the mother -

is suffering from some such acute form of emotionality that she is unable to cope and is looking desperately for a shoulder to cry on. In these cases much real information may be revealed in the original interviews, but in the writer's experience this is rare. As KOHN and CARROLL (1960) and WHITTEN (1969) warn, all information especially of a retrospective nature must be treated with caution as much can be very selective.

Again, as the relationship between the social worker and the parent(s) deepened with further interviews,<sup>(1)</sup> confidences were obtained much more freely and a more complete and truthful picture particularly of parental disturbance was built up. The writer, nor the workers involved do not however feel that the picture of the family in any of its aspects is necessarily complete. Parents hold back information, and make selections to suit their own whims. Occasionally information withheld by the parent may be revealed by the child to another worker in the clinic e.g. "My mother has a part-time job" or "Uncle Simon stayed with us again last night", and this information might explain gaps in a puzzle, or lead to the re-orientation of previously gathered information. For the most part the overall assessments made by the workers involved must be taken as correct, but it is impossible to tell whether all the factual information one has is complete or true.

Thus the second task of the writer was to read through the full social and psychiatric reports, extract information and set this against criteria for judging perinatal emotional stress and parental emotional disturbance - itself a task fraught on the part of the writer with the dangers of subjective selection.

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(1) The growth of a relationship of trust between parent and social worker did not happen in all cases. Very occasionally a "horses for courses" policy was adopted whereby one social worker would "pass on" a particular parent to another social worker who, she thought, would be better able to establish stronger rapport than herself.

Criteria for judging perinatal emotional stress in the mother were adapted from an M.Ed thesis by MCKERRACHER (1961):-

- (a) loss or illness of a loved one;
- (b) marital problems involving emotional upset;
- (c) pre-marital conception;
- (d) worry about long absences of husband during and/or after pregnancy;
- (e) severe shock e.g. street accident;
- (f) worry concerning the security and/or comfort of home e.g. threat of eviction, financial worry, overcrowding;
- (g) serious trouble with in-laws.

In order to assess parental emotional disturbance it had been found impossible to match information in the case histories with an inventory such as the parental "Malaise inventory" used by RUTTER et al (1970), because the histories did not lend themselves to easy answering of the questions involved. Therefore the following (also from McKerracher) were used as criteria for parental emotional disturbance:-

- (a) alcoholism;
- (b) chronic nervousness -asthma, depression, and psoriasis - when treated by a doctor;
- (c) chronic inability to cope with family situations;
- (d) chronic financial problems;
- (e) any kind of psychiatric treatment;
- and (f) severe and chronic parental conflict.

The findings are recorded in Appendix 11 under column heads M (perinatal emotional maternal distress) and D (parental emotional disturbance). The information is coded such that 1 represents the presence of, and 0 the absence of distress or disturbance.

CHAPTER X111

A BRIEF ACCOUNT OF THE STATISTICAL PROCEDURES.

The following are the statistical procedures used in this research:

- (1) Pearson Product Moment Correlation Coefficient;
- (2) Regression and Multiple correlation;
- (3) Chi-square;
- (4) Fisher Exact Probability Test;
- and (5) Fisher Test of Significance.

(1) CORRELATION

Measures of correlation take values ranging from -1 to +1. The value -1 describes perfect negative relation, +1 perfect positive relation, and 0 the absence of a relation.

The product - moment coefficient of correlation may be thought of as the ratio which expresses the extent to which changes in one variable are accompanied by changes on a second variable. It is the mean of the products of standard scores on the two variables expressed

$$r_{xy} = \frac{\sum \left( \frac{x}{\sigma_x} \cdot \frac{y}{\sigma_y} \right)}{N}$$

or more usually

$$r_{xy} = \frac{\sum xy}{N \sigma_x \cdot \sigma_y}$$

Many forms of correlation e.g. point biserial  $r$  using a variable which can be classified into two distinct categories, such as Accepting - Rejecting, stressed and non-stressed, are particular cases of this coefficient and shorter methods of calculation are available depending on the type of data. These are fully discussed in GARRETT (1966) and FERGUSON (1966).

Little importance can be attached to correlation coefficients calculated on small samples unless these coefficients are fairly large. The significance of an obtained  $r$  can be tested by using the  $t$  distribution. The  $t$  value required is given by

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

This is discussed in FERGUSON (p.187) who gives the table of the values of  $r$  required for significance which is used in this study.

### Partial Correlation

Garrett (p.403) writes that the correlation between two variables is sometimes misleading and may be erroneous if there is little or no correlation between the variables other than that brought about by their common dependence upon a third variable (or several variables). If 1 = reading score, 2 = chronological age and 3 = W.I.S.C. Verbal I.Q.,  $r_{12.3}$  represents the partial correlation between 1 and 2 (reading score and C.A.) when 3 (Verbal I.Q.) is held constant, or "partialled out". The formulae for

calculating the partial correlation coefficient to eliminate a third variable are

$$r_{12.3} = \frac{r_{12} - r_{13} r_{23}}{\sqrt{(1 - r_{13}^2)(1 - r_{23}^2)}}$$

$$\text{And } r_{13.2} = \frac{r_{13} - r_{12} r_{23}}{\sqrt{(1 - r_{12}^2)(1 - r_{23}^2)}}$$

## (2) REGRESSION and MULTIPLE CORRELATION

Having found the correlation coefficient ( $r$ ) between two tests it is possible to derive a regression equation from which a range of scores can be predicted within which a child's score on one test may fall a given number of times per hundred measures, given his score on the other test. Given a child's I.Q. score, for example, his reading score can be predicted by fitting a straight line (if the relationship is linear) to the data. This straight line, or regression line, provides an average statement about the change in one variable A, with change in the other B, and describes a trend in the data, based on all the observations. A second regression line provides an average statement about the change in B with the change in A. The angle between the two lines reflects the correlation between the two tests such that the smaller the angle the greater correlation.

The predicted values may be related to the known values by the regression equation:-

$$y = bx + a$$

where  $b$  is a constant known as the regression coefficient, and  $a$  is the mean of test  $Y$ . This can further be expanded:-

$$\hat{Y} = \frac{r \cdot \sigma_y}{\sigma_x} \cdot (X - M_X) + M_Y$$

where  $r$  = coefficient of correlation

$\sigma_y$  = S.D of test  $Y$

$\sigma_x$  = S.D of Test  $X$

$M_X$  = Mean of Test  $X$

$M_Y$  = Mean of Test  $Y$

$X$  = a given score

(  $\frac{r \cdot \sigma_y}{\sigma_x}$  is the regression coefficient ).

This is the regression equation of  $Y$  on  $X$  in score form.

$$\hat{X} = \frac{r \cdot \sigma_x}{\sigma_y} \cdot (Y - M_Y) + M_X$$

is the regression equation of  $X$  on  $Y$  in score form.

The predicted values  $\hat{X}$  and  $\hat{Y}$  are the most probable values of the dependent variable which can be obtained from a given value of the independent variable. The question arises as to the accuracy of this most probable estimate. This accuracy is expressed by quoting a range of scores within which the true score is likely to fall say 95% of the time. Provided there is linearity, the distributions are normal, and there is an equal scatter for each row in the correlation table (homoscedasticity) the standard deviation of the distribution is taken as the standard error of estimate (S.E.est) and is found by the formula

$$\sigma_y \sqrt{1 - r^2}$$

The size of S.E.est. therefore depends on the S.D. of the dependent variable and upon the extent of correlation between the dependent and independent variable.

Some improvement is to be gained in efficiency of prediction by employing several predictors and by weighting them according as they correlate with the unknown test. A multiple prediction equation is developed of the form

$$\hat{X}_1 = b_2 X_2 + b_3 X_3 + K$$

where  $b_2$  and  $b_3$  are the partial regression coefficients which may be obtained by the formulae

$$b_{12.3} = r_{12.3} \cdot \frac{\sigma_{1.23}}{\sigma_{2.13}}$$

$$b_{13.2} = r_{13.2} \cdot \frac{\sigma_{1.23}}{\sigma_{3.12}}$$

$$K = M_{X_1} - b_2 M_{X_2} - b_3 M_{X_3}$$

These  $b$  values can be regarded the ideal weights to be given to the two independent (predictor) variables.

When expressed in terms of  $\beta$  scores the partial regression coefficients ( $b^s$ ) are usually called beta ( $\beta$ ) coefficients and can be calculated directly from the  $b^s$  as follows:

$$\beta_{12.3} = b_{12.3} \frac{\sigma_2}{\sigma_1}$$

and

$$\beta_{13.2} = b_{13.2} \frac{\sigma_3}{\sigma_1}$$

Using beta coefficients the multiple correlation coefficient,  $R$ , can be calculated

$$R = \sqrt{\beta_2 r_{12} + \beta_3 r_{13}}$$

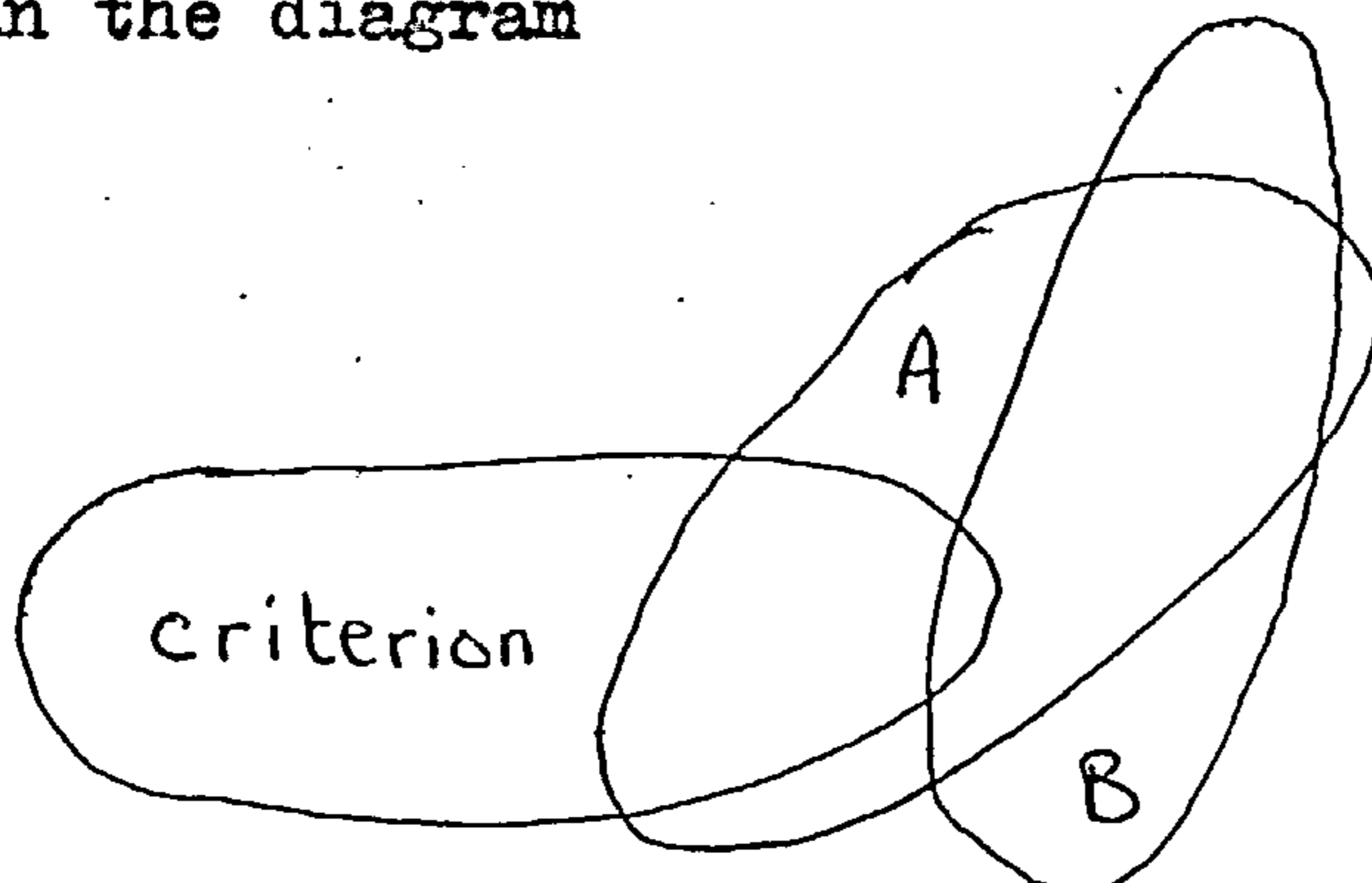
The standard error of estimate can be calculated

$$S.E. \text{ est.} = \sigma_y \sqrt{1 - R^2}$$

Having found  $R$  we can account for the approximate individual contribution of each independent variable to the variance. For example Appendix 111 (p. A22) shows the prediction of reading ability from C.A. and W.I.S.C. Verbal I.Q. among the younger and older children in this study. For the older children,  $R^2$  (.49) gives the proportion of variance of the criterion measure - reading age - attributable to the joint action of the variables C.A. and I.Q. 49% of whatever makes this group of older children differ in reading ability can be attributed to differences in C.A. and I.Q. Thus from the equation  $R^2 = .091 + .40$  we know that 9% is the approximate contribution of C.A. to the variance of reading age and 40% is the approximate contribution of I.Q. The remaining 51% of the variance of reading age is unaccounted for and is attributed to factors not measured in this problem (see Garrett p.419).

Suppressor variables.

The prediction model requires predictor variables which are highly related to the criterion but generally unrelated to each other. The ideal model would have a set of predictor variables which are highly correlated with the criterion and whose average intercorrelations approach zero. However, HORST (1941) (cited by WIGGINS 1973) called attention to the fact that additional predictors, need not always function in this manner to contribute predictive increments to  $R^2$ . Variables which correlate highly with each other and poorly with the criterion are known as "Suppressor Variables". Suppose as in the diagram



test A has good correlation with the criterion, while test B has poor correlation with the criterion, but good correlation with test A. Test B acts as a suppressor i.e. it takes out some of test A's "non-valid" variance thus raising the criterion correlation of the battery and giving a more valid measure of the criterion than can be attained by test A alone.

In this study, for example, among Older Girls (reading), (N = 34), the predictor variable Extraversion correlates .077 with the criterion; however Extraversion correlates .403 (significant at .05) with another predictor - I.Q. Thus the intercorrelation of the two predictor variables is high, while that of Extraversion with the criterion is approaching zero. (Appendix XX11 )

Discussion of Suppressors is to be found in MCNEMAR (1962 pp. 186-7); GARRETT (1966 pp.420-1) and more fully in WIGGINS (1973 pp.30-38).

Correlation and regression analyses were carried out by the Honeywell Time Sharing Programme STA075 which uses the least squares technique (see also HAYS 1963 and particularly KERLINGER and PEDHAZUR 1973). By this, analysis of variance is used to calculate  $R^2$ :-

$$R^2 = 1 - \frac{\text{Error Sum of Squares}}{\text{Total Sum of Squares.}}$$

The use of this method results in a minor and insignificant difference in the calculation of  $R^2$  from that calculated as above. It also however derives an F - Ratio

$$F = \frac{\text{Mean Square Regression}}{\text{Mean Square Error}}$$

This F - Ratio tells us whether or not the regression of Y on the independent variables is statistically significant. It tells us little or nothing about the magnitude of the relation. If the F - Ratio be not significant (as in the brain-injured group here)<sup>(1)</sup> we do not ask about this magnitude which is explained by  $R^2$ .

### (3) THE CHI-SQUARE TEST

When the data consists of frequencies in discrete categories chi-square is used to compare observed and theoretical frequencies. The more closely the observed results approximate the expected, the smaller the chi-square and the closer the agreement between the observed data and the hypothesis being tested. The larger the chi-square the greater the probability of a real divergence of observed from expected results. If the divergence is significant this provides evidence for the rejection of the hypothesis that gave rise to the theoretical frequencies. This is tested by

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

where  $f_o$  = frequency of observed number of cases  
in a given cell,

$f_e$  = expected frequency in that cell.

The expected (or theoretical) frequencies are those we should expect to obtain if the two variables were independent of each other, given the marginal totals of the rows and the columns; these frequencies are calculated by multiplying the two marginal totals common to a particular cell and dividing this product by the number of cases, N.

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(1) Appendix XV111 (pp.A96-A97).

When d.f. are greater than 1, i.e. when dealing with cells drawn up in a table greater than 2 x 2, chi-square is used if less than 20% of the cells have an expected frequency of less than 5 and no cell has an expected frequency less than 1. If these requirements are not met, adjacent categories may be combined to increase the expected frequencies in the various cells.

If the frequencies are cast in a 2 x 2 contingency table and N is greater than 40, chi-square with Yate's correction for continuity (see SIEGEL 1956) is used:-

$$\chi^2 = \frac{N \left( |AD - BC| - \frac{N}{2} \right)^2}{(A+B)(C+D)(A+C)(B+D)}$$

where A, B, C, and D are the obtained frequencies in each of the cells:-

A	B
C	D

This formula is also used when N is between 20 and 40 if all the expected frequencies are 5 or more.

#### (4) THE FISHER EXACT PROBABILITY TEST.

This test of the significance of a 2 x 2 table enables the calculation of exact probabilities and is appropriately used when expected cell frequencies are small, and do not meet with the requirements noted above for chi-square. It is used as with chi-square for analyzing discrete data, where every subject in both groups obtains one of two possible scores - in this research this procedure was used in comparing the categorizations of the judges and allied professions; the scores are Accepting, Rejection. The test determines whether the two groups differ in the proportion with which they fall into the two classifications.

The probability of observing a particular set of cell frequencies, when the marginal totals are regarded as fixed, is obtained by

$$P = \frac{(A+B)! (C+D)! (A+C)! (B+D)!}{N! A! B! C! D!}$$

i.e. the probability is the product of the factorials of the marginal totals divided by  $N!$  times the product of the factorials of the cell frequencies.

The probabilities associated with the observed tables and those that represent more extreme departures from expectation in the same direction are calculated and summed. This sum is the probability we would find by the Fisher test. Since the observed frequencies in this research were extreme it was not necessary to sum, nor was it necessary to use Tocher's modification, which is discussed in SIEGEL (1956).

#### (5) THE FISHER TEST OF SIGNIFICANCE.

To find significance levels rather than exact values of  $P$ , as was done here in the zone analyses where numbers are less than 30 and where neither of the totals in the right - hand margin is larger than 15, the method outlined in Siegel pp.99-101 is used. Tables are provided in Siegel based on the Fisher Test of Exact Probability.

CHAPTER XIV

DIVISION OF THE DATA INTO ZONES AND LEVELS

Most studies which have investigated the relationships between personality variables and attainment have used correlation techniques. EYSENCK (1966), as FINLAYSON (1970) says, has criticized such techniques on two grounds a) because linearity cannot be assumed if the Yerkes - Dodson 'Law' is held to apply to the effects of Neuroticism and b) because interaction effects cannot be studied. CHILD (1964) abandoned correlation coefficients in favour of a procedure adapted from Furneaux dividing Neuroticism and Extraversion into zones. FINLAYSON (1970) also used this method of zone analysis which has the great advantage that trends in the data are more easily discerned.

In this research both correlation and zone analysis techniques are used. Neuroticism is divided into stability, low neuroticism, and high neuroticism, where stability is the lower third, low neuroticism the middle third, and high neuroticism the top third, in each of the four main samples. Extraversion is divided into introversion, ambiversion and extraversion in the same way. Parental Attitude, Perinatal Emotional Maternal Distress, and Parental Emotional Disturbance are dichotomies for which the coding 1 and 0 is used.

The dependent variables, reading and arithmetic, are divided into three levels of achievement - under normal, and high - in the following way:- in the case of YB (Younger Boys) (N = 74 rdg.; N = 44 arith) and OB (Older Boys) (N = 60 rdg., N = 42 arith) underachievers and high achievers are defined as those whose obtained reading age is under or over  $\pm .848$  of the residual  
( obtained RA - predicted RA) respectively,  
S.E.

and in the case of the YG (Younger Girls) (N = 31 rdg; N = 22 arith.) and OG (Older Girls) (N = 34 rdg; N = 28 arith) underachievers are the bottom third and high achievers are the top third of the residual.

For the Brain-injured Group, comprising thirty four boys and girls of mixed ages, Neuroticism and Extraversion were each divided into two zones - high and low neuroticism, extraversion - introversion - as a function of the published norms (Eysenck 1965) for his or her sex and age group. Further, reading ages were predicted from the same equations computed for the other children in this study, i.e. no separate equation was computed for the brain-injured children as a group, and levels of achievement in reading were derived in the same manner as for YB and OB above.

Details of the zones for all the groups are in Appendix XV11 (pp. A72 - A78).

CHAPTER XV

PROCEDURE

Between 1969 and 1974 the writer examined the case records of 258 children who had been referred for treatment to Notre Dame Child Guidance Clinic, Glasgow. 199 children who fulfilled the criteria set out elsewhere were given the Junior Eysenck Personality Inventory<sup>(1)</sup> and the Schonell Word Reading Test R1. In the case of those children who had been given a Binet test, the writer also administered the Verbal Scale of the W.I.S.C. Of these 199 children, 136 were also given the addition and subtraction sections of the Burt Four Rules Test. Using the Schonell reading age and a modified Burt arithmetic age as dependent variables a predicted reading age, and a predicted arithmetic age where possible, were calculated by the use of a regression equation in which C.A. and W.I.S.C. Verbal I.Q. were the predictor variables. These predictions were made for all older children and all younger children, the median age being 9.45 years.

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(1) An important variation from the normal administration of this inventory was made. Under normal circumstances the child is required to read and answer each item for himself. However, COOKSON (1970) found that for ten to eleven year old boys and girls a Schonell word reading age of 8 to 8.5 years "is probably necessary for reading the inventory... a number of the duller children could not understand a fair sprinkling of the items and... some average and above average children also had difficulty" Indeed EYSENCK and COOKSON (1969) had found it necessary to give additional oral explanations for the benefit of younger children - as had LYTTON (1968) with the J.M.P.I. Both because of the type of child involved and because much the same difficulties in reading and interpreting the items as reported in the above papers were met with here, the writer read aloud and explained each item where necessary to individual children.

Further, following Eysenck and Cookson's recommendation children (two of the original 258) were excluded because their Lie Scores were above 8.

With the exception of 40% of the intelligence testing and some fourteen reading and personality tests administered by two other psychologists, all the psychological and attainment assessments and calculations were made by the writer. To obviate one source of constant error the writer administered all these tests in the same room - a pleasantly furnished library within the clinic.

A clinic team of judges consisting of three Psychiatric Social Workers, a Family Case Worker, and a Probation Officer, was tested for reliability in categorizing the attitudes of parents towards their children, both among themselves and in comparison with the ratings of forty six others in related professions. A further check was made by comparing the judges' categorizations with those of two play therapists in the clinic. The assessments of the team of five judges were used as categorizations of parental Accepting and Rejecting attitudes. The validity of their judgements rested upon the clinic as an observation base. (Chapter XI)

The reports of the psychiatrists and social workers were critically read through and information concerning Perinatal Emotional Maternal Distress and Parental Emotional Disturbance was abstracted by the writer. (Chapter XII )

The following types of data were gathered:-

- (1) child's chronological age;
- (2) full scale I.Q.;
- (3) W.I.S.C. Verbal I.Q.;
- (4) Schonell Word Reading Age;
- (5) arithmetic age (for reduced sample);
- (6) introversion - extraversion;
- (7) stability - neuroticism;
- (8) parental attitude;
- (9) perinatal emotional maternal distress;
- and (10) emotional disturbance in either parent.

The same types of data, excluding arithmetic, were gathered for a group of thirty four children assessed as brain-injured by the Bender-Gestalt Test.

The children were divided into five groups - Younger and Older Boys, Younger and Older Girls, and brain-injured boys and girls. Correlations were calculated between reading/arithmetic attainment and the above variables excluding full scale I.Q. Three levels of achievement were calculated from the predicted reading/arithmetic ages; Neuroticism and Extraversion were divided into zones (Chapter XIV); and with these data and with dichotomous data concerning parental attitudes, Perinatal Emotional Maternal Distress, and Parental Emotional Disturbance, chi-square and Fisher Tests were used in a zone analysis of each of the five groups.

All the above variables, again excluding full scale I.Q., were cast in a regression analysis with the obtained reading and arithmetic ages (excepting arithmetic in the Brain-injured Group) as the criterion variables for each of the five groups. This was done as described by KERLINGER and PEDHAZUR (1973 pp. 8 and 73) whereby dichotomous and continuous variables can be used together. The individual contribution of each variable to the variance was then calculated.

All correlation and regression analyses were carried out with Honeywell Time Sharing Statistical Package programme number STA078 Fortran (HONEYWELL 1971).

The following hypotheses (based for the most part on the literature) were tested:-

1 Parental acceptance of the child is associated with high attainment and with levels of normal and high achievement, and rejection is associated with low attainment and underachievement in reading and arithmetic.

ii Stability is associated with high attainment and with levels of normal and high achievement, while high neuroticism is associated with low attainment and underachievement in reading and arithmetic.

iii Introversion is associated with low attainment and with underachievement, and extraversion with high attainment and achieving levels in reading and arithmetic.

iv The presence of perinatal emotional maternal distress is associated with low attainment and with underachievement in the children's reading and arithmetic.

v Emotional disturbance in the parent is associated with low attainment and with underachievement in the children's reading and arithmetic.

vi I.Q. and C.A. will consistently make the largest contribution to attainment; Parental Attitude, Neuroticism, and Extraversion form a group of variables which will make the next largest contribution; and Perinatal Emotional Maternal Distress and Parental Emotional Disturbance will make the least contribution to attainment.

PART FOUR

CHAPTER XVI

RESULTS

Results for YB, OB, YG, and OG are grouped in three sections for both reading and arithmetic; the results for the Brain-injured Group are together in a fourth section.

Section A. Correlations between obtained reading and arithmetic ages and the following variables - parental attitude, C.A., Verbal I.Q., Neuroticism, Extraversion, Perinatal Emotional Maternal Distress and Parental Emotional Disturbance.

Section B. A zone analysis in which goodness-of-fit techniques are used to determine the association between the above variables, excluding C.A. and Verbal I.Q., and levels of reading and arithmetic achievement. Underachievers and high achievers among YB and OB are defined as having an obtained reading or arithmetic age lying outwith  $\pm .848$  of the residual i.e.  $(\text{obtained RA} - \text{predicted RA})$   
S.E.

Among YG and OG underachievers and high achievers are defined as the bottom and top thirds of the residual.

Section C. A regression analysis is used, such that obtained reading age, and obtained arithmetic age are the criterion variables, and all the variables mentioned in Section A are predictor variables, to analyse the contribution of the individual variable to the relevant variance.

Section D. The correlations with attainment, the zone analysis of different levels of achievement, and the regression analysis for the Brain-injured Group are reported together in this section.

A. CORRELATIONS BETWEEN VARIABLES AND READING  
AND ARITHMETIC ATTAINMENT.

Intercorrelation matrices were calculated for each of the four age/sex groups for both reading and arithmetic attainment as part of Honeywell programme STA078. These matrices are in Appendix XV111 (pp.A79-A97) which also shows the levels of significance between the variables and reading/arithmetic.

(1) READING

Parental attitudes

In all four groups Acceptance, as expected, is associated with reading attainment. However only among the YB is it significant (.025).<sup>(1)</sup>

Chronological age.

Chronological age is positively and significantly correlated with reading attainment among the YG (.005)<sup>(2)</sup> and among the OB (.05).<sup>(3)</sup> In the remaining two groups there are small, non-significant, but positive, correlations.

Verbal I.Q.

Verbal I.Q. is positively correlated at the .005 level of significance with the YB,<sup>(4)</sup> OB,<sup>(5)</sup> and OG.<sup>(6)</sup> Strikingly, however, the correlation among the YG is extremely small (  $r = .098$  )

- 
- |     |                       |       |
|-----|-----------------------|-------|
| (1) | Appendix <u>XV111</u> | p.A80 |
| (2) | "                     | p.A84 |
| (3) | "                     | p.A82 |
| (4) | "                     | p.A80 |
| (5) | "                     | p.A82 |
| (6) | "                     | p.A86 |

### Neuroticism

Among both groups of younger children there is an unexpected positive correlation between Neuroticism and reading attainment, reaching a two tailed significance (.05) among YB.<sup>(7)</sup> Among OB and OG the relationship, though not significant, is in the expected negative direction.

### Extraversion.

As expected there is a positive relationship between Extraversion and reading attainment among YG, OG, and YB. Among this latter group correlation reaches the .05 level of significance.<sup>(8)</sup> Using a two-tailed test the relationship between Extraversion and reading attainment among OB reaches significance at the .02 level<sup>(9)</sup> such that introversion appears to be associated with high reading attainment.

### Perinatal Emotional Maternal Distress

A surprisingly positive though low correlation between Perinatal Emotional Maternal Distress and reading attainment is seen among YB, OB, and OG, while YG show the expected negative, but low, correlation.

### Parental Emotional Disturbance

Among the boys, both older and younger, Parental Emotional Disturbance is positively correlated with reading attainment, while this correlation is negative, as expected, among YG and OG. In no case is significance reached.

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(7) Appendix XV111 p.A80  
(8) " p.A80  
(9) " p.A82

The above results are summarized below in Table 7.

TABLE 7

SUMMARY OF THE CORRELATIONS OF THE VARIABLES  
WITH READING ATTAINMENT AMONG THE FOUR MAIN  
GROUPS, WITH LEVELS OF SIGNIFICANCE.

(See also Appendix XXI pp. A114f. )

	YB		OB		YG		OG	
Parental Attitude	+	.025	+		+		+	
C.A.	+		+	.05	+	.005	+	
I.Q.	+	.005	+	.005	+		+	.005
N.	+	.05*	-		+		-	
E.	+	.05	-	.01*	+		+	
Perinatal Distress	+		+		-		+	
Parental Disturb.	+		+		-		-	

\* Two-tailed

(2) ARITHMETIC

Parental attitude

As in reading, Acceptance is correlated with arithmetic attainment among YB and OG reaching significance (.05)<sup>(10)</sup> among YB. Among OB and YB the relationship is between Rejection and arithmetic attainment but neither of these are significant.

Chronological age

Chronological age has a positive relationship throughout being at the .01 and the .025 level of significance respectively among YB<sup>(11)</sup> and OG.<sup>(12)</sup>

(10) Appendix XV111 p. A88

(11) " p. A88

(12) " p. A94

Verbal I.Q.

Verbal I.Q. is positively correlated with arithmetic attainment in all four groups reaching significance (.005) among YB<sup>(13)</sup> and OB,<sup>(14)</sup> among OG,<sup>(15)</sup> and among YG<sup>(16)</sup>.

Neuroticism

Negative, but non-significant, relationships are seen between Neuroticism and arithmetic attainment among OB, YG, and OG. Among OB significance is just missed by .002.<sup>(17)</sup> There is a positive non-significant relationship among YB.

Extraversion

No significance is reached between Extraversion and arithmetic attainment where the relationships, as expected, are positive, with the exception of YG.

Perinatal Emotional Maternal Distress

No significance is reached between Perinatal Emotional Maternal Distress and arithmetic attainment. In both younger groups the relationship is in the direction expected - negative; it is positive among both older groups.

Parental Emotional Disturbance

There is no significant relationship between Parental Emotional Disturbance and arithmetic attainment. Here the expected negative correlation is seen only among YB.

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(13)	Appendix <u>XV111</u>	p.A88
(14)	"	p.A90
(15)	"	p.A94
(16)	"	p.A92
(17)	"	p.A90

These results are summarized in table 8 below.

TABLE 8

SUMMARY OF THE CORRELATIONS OF THE VARIABLES  
WITH ARITHMETIC ATTAINMENT AMONG THE FOUR  
MAIN GROUPS, WITH LEVELS OF SIGNIFICANCE.  
 (See also Appendix XXI pp.A114F ).

	YB	OB	YG	OG
Parental Attitude	+ .05	-	-	+
C.A.	+ .01	+	+	+ .025
I.Q.	+ .005	+ .005	+ .05	+ .01
N.	+	-	-	-
E.	+	+	-	+
Perinatal Distress	-	+	-	+
Parental Disturb.	-	+	+	+

B. ZONE ANALYSES OF LEVELS OF ACHIEVEMENT

Chi-square and the Fisher Test of significance were applied to each of the four age/sex groups to determine the degree of association between the five major variables and levels of reading and arithmetic achievement. The results are given here under the separate headings of reading and arithmetic. The relevant contingency tables are in Appendix X1X (pp. A98-A106), and both here and in that appendix the tables have the same bracketed number, thus (1) here refers to contingency table (1) in the appendix.

I READING

PARENTAL ATTITUDE.

Younger Boys (1)

Of the 74 YB, 42 were accepted, of whom 5 were underachievers, 23 were normals, and 14 were high achievers; 32 were rejected, of whom 12 were underachievers, 16 were normals, and 4 were high achievers.

From (1),  $X^2 = 8.48$

d.f. = 2

P < .02

Acceptance appears to be significantly associated with achievement and Rejection with underachievement in this group of YB.

Older Boys (2)

Of the 60 OB, 26 were accepted, of whom 7 were underachievers, 13 were normals, and 6 were high achievers; 34 were rejected, of whom 9 were underachievers, 21 were normals, and 4 were high achievers.

$$\begin{array}{rcl} \text{From (2)} & x^2 & = 1.496 \\ & \text{d.f.} & = 2 \\ & P & > .05 \end{array}$$

Parental Attitude does not appear to be significantly associated with different levels of achievement in reading in this group of OB.

### Younger Girls (3)

Of the 31 YG, 16 were accepted, of whom 1 was an underachiever, 6 were normals, and 9 were high achievers; of the 15 rejected, there were 10 underachievers, 5 normals, and 1 achiever. Since a 3 x 2 chi-square was not valid a 2 x 2 contingency table was drawn up in which the normal achievers were divided equally between the normal and high achievers as in (3).

$$\begin{array}{rcl} \text{From (3),} & x^2 & = 6.329 \\ & \text{d.f.} & = 1 \\ & P & < .01 \end{array}$$

Acceptance appears to be significantly associated with good achievement and Rejection with underachievement in reading in this group of YG.

### Older Girls (4)

Of the 34 OG, 15 were accepted, and of these 3 were underachievers, 7 were normals, and 5 were high achievers; 19 were rejected, of whom there were 8 underachievers, 5 normals, and 6 high achievers. Cells were combined in a similar manner to that of (3).

$$\begin{array}{rcl} \text{From (4),} & x^2 & = 0.11 \\ & \text{d.f.} & = 1 \\ & P & > .05 \end{array}$$

Parental attitude does not appear to be significantly associated with achieving or underachieving in reading among these OG.

TABLE 9

CHI-SQUARE TESTS RELATING TO PARENTAL ATTITUDE  
AND READING ACHIEVEMENT LEVELS

YB	OB	YG	OG
.02		.01	

NEUROTICISM

Younger Boys (5)

Of the 27 high neurotic YB, 2 were underachievers, 15 were normals, and 10 were high achievers; of the 25 low neurotics, 5 were underachievers, 17 were normals, and 3 were high achievers; of the 22 stables, 10 were underachievers, 7 were normals, and 5 were high achievers.

$$\begin{aligned} \text{From (5), } X^2 &= 14.2 \\ \text{d.f.} &= 4 \\ P &< .01 \end{aligned}$$

Surprisingly, high neuroticism appears to be very significantly associated with high achievement, and stability with underachievement in this group of YB.

Older Boys (6)

Of the 21 high neurotics, 5 were underachievers, 14 were normals, and 2 were high achievers; of the 23 low neurotics, 7 were underachievers, 12 were normals, and 4 were high achievers; of the 16 stables, 4 were underachievers, 6 were normals, and 6 were high achievers.

Cells were combined as in (6) where the normals were equally divided among the under and high achievers.

$$\begin{array}{rcl} \text{From (6), } & x^2 & = 0.4. \\ & \text{d.f.} & = 2 \\ & P & > .05 \end{array}$$

Level of Neuroticism does not appear to be significantly associated with level of reading achievement among these OB.

Younger Girls (7) and (8)

Of the 14 high neurotics, 2 were underachievers, 5 were normals, and 7 were high achievers; of the 7 low neurotics, there were 2 underachievers, 2 normals, and 3 high achievers; of the 10 stables, 6 were underachievers, 4 were normals, and none was a high achiever. The cells were combined as in (7) where the normals were divided equally between the under and high achievers.

$$\begin{array}{rcl} \text{From (7), } & x^2 & = 2.70 \\ & \text{d.f.} & = 1 \\ & P & > .05 \end{array}$$

For the .05 level of significance  $x^2$  must be 2.71 (two-tail). Therefore it appears that among YG high neuroticism just fails to be significantly associated with high achievement by .01

By combining the cells as in (8) where only the stables, high neurotics, underachievers and high achievers are considered, and using the Fisher test

$$P < .02 \text{ (two tail).}$$

Thus in a reduced sample, high neuroticism appears to be significantly associated with high achievement, and stability with underachievement in reading in this group of YG.

Older Girls (9)

Of the 13 high neurotics, 3 were underachievers, 7 were normals, and 3 were high achievers; of the 11 low neurotics, 4 were underachievers, 3 were normals, and 4 were high achievers; of the 10 stables, there were 4 underachievers, 2 normals, and 4 high achievers. These were combined in (9) where the low neurotics were divided equally between the stables and high neurotics, and the normals between the underachievers and the high achievers.

$$\begin{aligned} \text{From (9)} \quad X^2 &= 0.127 \\ \text{d.f.} &= 1 \\ P &> .05 \end{aligned}$$

It appears that level of Neuroticism is not significantly associated with level of reading achievement among these OG.

TABLE 10

CHI-SQUARE AND FISHER TESTS RELATING TO  
LEVELS OF NEUROTICISM AND READING ACHIEVEMENT  
LEVELS

YB	OB	YG	OG
.01*		.02* R	

\* In opposite direction to hypothesis

R When only a reduced sample is considered.

EXTRAVERSION

Younger Boys (10)

Of the 23 extraverts, 4 were underachievers, 12 were normals, and 7 were high achievers; of the 27 ambiverts, 6 were underachievers, 12 were normals, and 9 were high achievers; of the 24 introverts, 7 were underachievers, 15 were normals, and 2 were high achievers.

$$\begin{aligned}\text{From (10), } X^2 &= 5.279 \\ \text{d.f.} &= 4 \\ P &> .05\end{aligned}$$

It appears that level of Extraversion is not significantly associated with level of reading achievement among these YB.

Older Boys (11)

Of the 19 extraverts, 7 were underachievers, 11 were normals, and 1 was a high achiever; of the 19 ambiverts 9 were underachievers, 8 were normals, and 2 were high achievers; of the 22 introverts, none was an underachiever, and there were 13 normals and 9 high achievers. These were combined as in (11) where the normals were divided equally between the under and high achievers.

$$\begin{aligned}\text{From (11), } X^2 &= 7.931 \\ \text{d.f.} &= 2 \\ P &< .02\end{aligned}$$

It appears that, contrary to the hypothesis, introversion is significantly associated with reading achievement in this group of OB.

Younger Girls(12)

Of the 8 extraverts, 2 were underachievers, 2 were normals, and 4 were high achievers; of the 13 ambiverts, 5 were underachievers, 5 were normals, and 3 were high achievers; of the 10 introverts there were 3 underachievers, 4 normals, and 3 high achievers. These were combined as in (12) where the ambiverts and normals were divided equally between the introverts/extraverts, and under/high achievers.

$$\begin{aligned}\text{From (12), } X^2 &= 0 \\ \text{d.f.} &= 1 \\ P &> .05\end{aligned}$$

It appears that level of Extraversion is not significantly associated with level of reading achievement in this group of YG.

Older Girls(13)

Of the 11 extraverts, 5 were underachievers, 4 were normals, and 2 were high achievers; of the 11 ambiverts, 4 were underachievers, 4 were normals, and 3 were high achievers; and of the 12 introverts, 2 were underachievers, 4 were normals, and 6 were high achievers. These were combined as in (13) in the same manner as in (12).

$$\begin{aligned}\text{From (13), } X^2 &= .0735 \\ \text{d.f.} &= 1 \\ P &> .05\end{aligned}$$

It appears that level of Extraversion is not significantly associated with level of reading achievement among these OG.

TABLE 11

CHI-SQUARE TESTS RELATING TO LEVEL OF  
EXTRAVERSION AND READING ACHIEVEMENT LEVELS

YB	OB	YG	OG
	.02*		

\* In opposite direction to hypothesis.

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PERINATAL EMOTIONAL MATERNAL DISTRESS

Younger Boys(14)

26 of the YB had mothers who had had symptoms of Perinatal Emotional Distress. Of these 26 children, 4 were underachievers, 12 were normals, and 10 were high achievers. Of the 48 others, 13 were underachievers, 27 were normals and 8 were high achievers:

$$\begin{array}{rcl}
 \text{From (14), } & x^2 & = 4.63 \\
 & \text{d.f.} & = 2 \\
 & P & > .05
 \end{array}$$

It appears that Perinatal Emotional Maternal Distress is not significantly associated with underachievement in reading .

Older Boys(15)

Of the 22 OB in the distress group, 4 were underachievers, 10 were normals, and 8 were high achievers. Of the remaining 38, 12 were underachievers, 22 were normals, and 4 were high achievers.

$$\begin{array}{rcl} \text{From (15),} & X^2 & = 3.32 \\ & \text{d.f.} & = 2 \\ & P & > .05 \end{array}$$

There does not appear to be any significant association between Perinatal Emotional Maternal Distress and these OB's underachievement in reading.

Younger Girls(16)

Of the 16 YG in the distress group, 6 were underachievers, 6 were normals, and 4 were high achievers; of the remaining 15, 4, 5, and 6 were underachievers, normals, and high achievers respectively. These were combined as in (16) where the normals were divided equally between the under and high achievers.

$$\begin{array}{rcl} \text{From (16),} & X^2 & = 0.129 \\ & \text{d.f.} & = 1 \\ & P & > .05 \end{array}$$

It appears the Perinatal Emotional Maternal Distress is not significantly associated with children's reading underachievement in this group of YG.

Older Girls(17)

Of the 20 OG in the distressed group, 6 were underachievers, 7 were normals, and 7 were high achievers; of the 14 others, 5 were underachievers, 5 normals, and 4 high achievers. These were combined in (17) in the same manner as in (16).

$$\begin{array}{rcl} \text{From (17)} & X^2 & = 0 \\ & \text{d.f.} & = 1 \\ & P & > .05 \end{array}$$

It appears that Perinatal Emotional Maternal Distress is not significantly associated with children's reading underachievement in this group of OG.

TABLE 12

RESULTS OF CHI-SQUARE TESTS RELATING TO THE ASSOCIATION BETWEEN PERINATAL EMOTIONAL MATERNAL DISTRESS AND READING UNDERACHIEVEMENT.

YB	OB	YG	OG
N.S.	N.S.	N.S.	N.S.

N.S. = Not significant.

---

PARENTAL EMOTIONAL DISTURBANCE

Younger Boys (18)

Of the 43 YB whose parents showed signs of emotional disturbance, 9 were underachievers, 24 were normals, and 10 were high achievers; of the remaining 31, 8 were underachievers, 15 were normals, and 8 were high achievers.

$$\begin{aligned}\text{From (18), } X^2 &= 0.45 \\ \text{d.f.} &= 2 \\ P &> .05\end{aligned}$$

Parental Emotional Disturbance does not appear to be significantly associated with level of children's reading achievement in this group of YB.

Older Boys(19)

Of the 35 OB in the disturbed group, 8 were underachievers, 19 were normals, and 8 high achievers; of the 25 others, 8 were underachievers, 13 were normals, and 4 were high achievers.

$$\begin{aligned}\text{From(19), } X^2 &= 0.78 \\ \text{d.f.} &= 2 \\ P &> .05\end{aligned}$$

Parental Emotional Disturbance does not appear to be significantly associated with children's reading achievement or underachievement in this group of OB.

Younger Girls(20)

Of the 13 YG in the disturbed group, 6 were underachievers, 5 were normals, and 2 were high achievers; of the remaining 18, 4 were underachievers, 6 were normals, and 8 were high achievers. These were combined as in (20) where the normals were divided equally between the under and high achievers.

$$\begin{aligned}\text{From(20), } X^2 &= 1.192 \\ \text{d.f.} &= 1 \\ P &> .05\end{aligned}$$

Parental Emotional Disturbance does not appear to be significantly associated with children's reading achievement or underachievement in this group of YG.

Older Girls(21)

Of the 18 OG in the disturbed group, 5, 6, and 7 were underachievers, normals, and high achievers respectively; and 6, 6, and 4 were in these categories among the non-disturbed group.

$$\begin{aligned}\text{From(21), } X^2 &= 0.52 \\ \text{d.f.} &= 2 \\ P &> .05\end{aligned}$$

Parental Emotional Disturbance does not appear to be significantly associated with level of children's reading achievement in this sample of OG.

TABLE 13

RESULTS OF CHI-SQUARE TESTS RELATING TO THE ASSOCIATION BETWEEN PARENTAL EMOTIONAL DISTURBANCE AND LEVELS OF READING ACHIEVEMENT.

YB	OB	YG	OG
N.S.	N.S.	N.S.	N.S.

N.S. = Not significant.

Table 14 gives a summary of all the above results.

TABLE 14

SUMMARY OF THE RESULTS OF CHI-SQUARE AND FISHER TESTS RELATING TO LEVELS OF ACHIEVEMENT IN READING (See also Appendix XXI)

	YB	OB	YG	OG
Parental Attitude	.02		.01	
N.	.01*		.02*R	
E.		.02*		
Perinatal distress				
Parental disturb.				

\* In opposite direction to hypothesis

R When only a reduced sample is considered.

II    ARITHMETIC

PARENTAL ATTITUDE

Younger Boys(22)

Of the 24 accepted YB, 2 were underachievers, 15 were normals, and 7 were high achievers; of the 20 rejected, 7 were underachievers, 12 were normals, and there was 1 high achiever. These were combined as in (22) where normals were divided equally between the under and high achievers.

$$\begin{aligned}\text{From(22), } \quad x^2 &= 1.894 \\ \text{d.f.} &= 1 \\ P &> .05\end{aligned}$$

It appears that parental attitude is not significantly associated with level of arithmetic achievement in this group of YB.

Older Boys(23)

Of the 21 accepted OB, 10 were underachievers, 8 were normals, and 3 were high achievers; of the 21 rejected, 3 were underachievers, 12 were normals, and 6 were high achievers. These were combined in (23) in the same manner as in (22).

$$\begin{aligned}\text{From(23), } \quad x^2 &= 1.5 \\ \text{d.f.} &= 1 \\ P &> .05\end{aligned}$$

Parental attitude does not appear to be significantly associated with level of arithmetic achievement in this group of OB.

Younger Girls(24)

Of the 9 accepted YG, 3 were underachievers, 2 were normals, and 4 were high achievers; of the 13 rejected, 4 were underachievers, 6 were normals, and 3 were high achievers. The normals were divided equally between the under and high achievers, and the Fisher test of significance applied.

From(24),  $P > .05$

Parental attitude does not appear to be significantly associated with level of arithmetic achievement among these YG.

Older Girls(25)

Of the 11 accepted OG, 3 were underachievers, 4 were normals, and 4 were high achievers; of the 17 rejected, 6 were underachievers, 6 were normals, and 5 were high achievers. These were combined in (25) in the same manner as in (24).

From 25,  $\chi^2 = 0$   
d.f. = 1  
 $P > .05$

Parental attitude does not appear to be significantly associated with level of arithmetic achievement among these OG.

TABLE 15

RESULTS OF CHI-SQUARE AND FISHER TESTS RELATING TO THE ASSOCIATION BETWEEN PARENTAL ATTITUDE AND ARITHMETIC ACHIEVEMENT LEVELS.

YB	OB	YG	OG
N.S.	N.S.	N.S.	N.S.

N.S.= Not significant

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NEUROTICISM

Younger Boys(26)

Of the 11 high neurotics, 1 was an underachiever, 6 were normals, and 4 were high achievers; of the 16 low neurotics, 5 were underachievers, 10 were normals, and 1 was a high achiever; of the 17 stables, 3 were underachievers, 11 were normals, and 3 were high achievers. These cells were combined as in (26) where the normals were divided equally between the under and high achievers.

$$\begin{array}{rcl}
 \text{From(26),} & x^2 & = 1.85 \\
 & \text{d.f.} & = 2 \\
 & P & > .05
 \end{array}$$

Level of Neuroticism does not appear to be significantly associated with level of arithmetic achievement in this group of YB

Older Boys(27) and (28)

Of the 17 high neurotics, 6 were underachievers, 10 were normals, and 1 was a high achiever; of the 14 low neurotics, 6 were underachievers, 5 were normals, and 3 were high achievers; of the 11 stables, 1 was an underachiever, and there were 5 normals and 5 high achievers. When combined as in (27) where normals were equally divided between the under and high achievers.

$$x^2 = 3.2. \quad (\text{d.f.} = 2),$$

which is not significant.

However there does appear to be a significant relationship (.05) between high neuroticism and underachieving, and between stability and high achieving when these four are taken alone and the Fisher test of significance applied (28).

Younger Girls(29)

Of the 11 high neurotics, 3 were underachievers, 3 were normals, and 5 were high achievers; of the 4 low neurotics, 1 was an underachiever, 2 were normals, and 1 was a high achiever; of the 7 stables, 3 were underachievers, 3 were normals, and 1 was a high achiever. These were combined as in (29) where normals and low neurotics were divided equally between the under and high achievers, and the stables and high neurotics respectively. The Fisher test of significance was applied.

From(29),  $P > .05$

Level of Neuroticism does not appear to be significantly associated with level of achievement in arithmetic among these YG.

Older Girls(30)

Of the 11 high neurotics, 2 were underachievers, 5 were normals, and 4 were high achievers; of the 9 low neurotics, 3 were underachievers, 4 were normals, and 2 were high achievers; and of the 8 stables, 4 were underachievers, 1 was a normal, and there were 3 high achievers. Cells were combined in the same manner as in (29).

From(30),  $\chi^2 = 0.03$   
d.f. = 1  
 $P > .05$

Level of Neuroticism does not appear to be significantly associated with level of arithmetic achievement in this group of OG.

TABLE 16

RESULTS OF CHI-SQUARE AND FISHER TESTS RELATING TO THE ASSOCIATION BETWEEN NEUROTICISM AND ARITHMETIC ACHIEVEMENT LEVELS.

YB	OB	YG	OG
	.05 <sup>R</sup>		

R Considering only a reduced sample.

EXTRAVERSION

Younger Boys(31)

Of the 11 extraverts, none was an underachiever, there were 8 normals and 3 high achievers; of the 20 ambiverts, 4 were underachievers, 13 were normals, and 3 were high achievers; of the 13 introverts, 5 were underachievers, 6 were normals, and 2 were high achievers. These were combined as in (31) where normals were divided equally between the under and high achievers.

$$\begin{array}{rcl} \text{From(31),} & x^2 & = 1.5 \\ & \text{d.f.} & = 2 \\ & P & > .05 \end{array}$$

Level of Extraversion does not appear to be significantly associated with level of arithmetic attainment in this group of YB.

Older Boys(32)

Of the 16 extraverts, 4 were underachievers, 8 were normals and 4 were high achievers; of the 13 ambiverts, 4 were underachievers, 8 were normals, and there was 1 high achiever; of the 13 introverts, 5 were underachievers, 4 were normals, and 4 were high achievers. The normals were divided equally between the under and high achievers.

$$\begin{array}{rcl} \text{From(32),} & x^2 & = 0.389 \\ & \text{d.f.} & = 2 \\ & P & > .05 \end{array}$$

Level of Extraversion does not appear to be significantly associated with level of arithmetic achievement in this group of OB.

Younger Girls(33).

Of the 5 extraverts, 3 were underachievers, 2 were normals, and there were no high achievers; of the 11 ambiverts, 3 were underachievers, 4 were normals, and 4 were high achievers; of the 6 introverts, 1 was an underachiever, and there were 2 normals and 3 high achievers. These were combined in (33) where the normals were divided equally between the under and high achievers, and the ambiverts between the introverts and extraverts. The Fisher test of significance was applied.

From(33),  $P > .05$

Level of Extraversion does not appear to be significantly associated with level of arithmetic achievement among these YG.

Older Girls(34)

Of the 10 extraverts, 4 were underachievers, 2 were normals and 4 were high achievers; of the 10 ambiverts, 3 were underachievers, 3 were normals, and 4 were high achievers. These were combined in (34) in a similar manner as in (33)

From(34),  $\chi^2 = 0.03$   
d.f. = 1  
 $P > .05$

It appears that level of Extraversion is not significantly associated with level of arithmetic achievement in this group of OG.

TABLE 17

RESULTS OF CHI-SQUARE AND FISHER TESTS RELATING TO THE ASSOCIATION BETWEEN EXTRAVERSION AND ARITHMETIC ACHIEVEMENT LEVELS.

YB	OB	YG	OG
N.S.	N.S.	N.S.	N.S.

N.S. = Not significant.

---

PERINATAL EMOTIONAL MATERNAL DISTRESS

Younger Boys(35)

Of the 14 YB in the distress group, 3 were under-achievers, 8 were normals, and 3 were high achievers; of the 30 remaining, 6 were underachievers, 19 were normals, and 5 were high achievers. These were combined as in (35) where the normals were divided equally between the under and high achievers.

From (35),  $\chi^2 = 0.04$

d.f. = 1

P > .05

There does not appear to be any significant association between Perinatal Emotional Maternal Distress and level of children's arithmetic achievement in this group of YB.

Older Boys(36)

Of the 16 OB in the distressed group, 5 were underachievers, 8 were normals, and 3 were high achievers; of the 26 remaining, 8 were underachievers, 12 were normals, and 6 were high achievers. The normals were divided equally between the under and high achievers.

$$\begin{array}{rcl} \text{From(36),} & x^2 & = 0.02 \\ & \text{d.f.} & = 1 \\ & P & > .05 \end{array}$$

It appears that Perinatal Emotional Maternal Distress is not significantly associated with level of children's arithmetic achievement in this group of OB.

Younger Girls(37)

Of the 12 YG in the distressed group, 4 were underachievers, 5 were normals, and 3 were high achievers, of the remaining 10, 3 were underachievers, 3 were normals, and 4 were high achievers. These cells were combined in (37) in the same manner as in (36) and the Fisher test of significance applied.

$$\text{From(37), } P > .05$$

It appears that Perinatal Emotional Maternal Distress is not significantly associated with level of children's arithmetic achievement among these YG.

Older Girls(38)

Of the 16 OG in the distressed group, 6 were underachievers, 5 were normals, and 5 were high achievers; of the 12 remaining, 3 were underachievers, 5 were normals, and 4 were high achievers. These were combined in (38) in the same manner as in (36)

$$\begin{aligned}\text{From(38), } X^2 &= 0 \\ \text{d.f.} &= 1 \\ P &> .05\end{aligned}$$

It appears that Perinatal Emotional Maternal Distress is not significantly associated with level of children's arithmetic achievement among these OG.

TABLE 18

RESULTS OF CHI-SQUARE AND FISHER TESTS RELATING TO THE ASSOCIATION BETWEEN PERINATAL EMOTIONAL MATERNAL DISTRESS AND THE CHILDREN'S LEVELS OF ARITHMETIC ACHIEVEMENT.

YB	OB	YG	OG
N.S.	N.S.	N.S.	N.S.

N.S. = Not significant.

PARENTAL EMOTIONAL DISTURBANCE

Younger Boys(39)

Of the 26 YB in the disturbed group, 5 were under-achievers, 16 were normals, and 5 were high achievers; of the 18 remaining, 4 were underachievers, 11 were normals, and 3 were high achievers. These were combined in (39) where the normals are equally divided between the under and high achievers.

$$\begin{aligned}\text{From(39), } \quad X^2 &= 0.01 \\ \text{d.f.} &= 1 \\ P &> .05\end{aligned}$$

Parental Emotional Disturbance does not appear to be significantly associated with level of children's arithmetic achievement in this group of YB.

Older Boys(40)

Of the 28 OB in the disturbed group, 10 were underachievers, 13 were normals, and 5 were high achievers; of the 14 remaining, 3 were underachievers, 7 were normals, and 4 were high achievers. These were combined in (40) in the same manner as in (39).

$$\begin{aligned}\text{From (40), } \quad X^2 &= 0.19 \\ \text{d.f.} &= 1 \\ P &> .05\end{aligned}$$

Parental Emotional Disturbance does not appear to be significantly associated with level of children's arithmetic achievement in this group of OB.

Younger Girls(41)

Of the 11 YG in the disturbed group, 4 were underachievers, 3 were normals, and 4 were high achievers; of the 11 remaining, 3 were underachievers, 5 were normals, and 3 were high achievers. These were combined in (41) in the same manner as in (39).

$$\begin{array}{rcl} \text{From (41),} & x^2 & = 0 \\ & \text{d.f.} & = 1 \\ & P & > .05 \end{array}$$

Parental Emotional Disturbance does not appear to be significantly associated with level of children's arithmetic achievement in this group of YG.

Older Girls(42)

Of the 15 OG in the disturbed group, 4 were under-achievers, 5 were normals, and 6 were high achievers; of the remaining 13, 5 were underachievers, 5 were normals, and 3 were high achievers. These were combined in (42) in the same manner as in (39).

$$\begin{array}{rcl} \text{From(42),} & x^2 & = 0.14 \\ & \text{d.f.} & = 1 \\ & P & > .05 \end{array}$$

Parental Emotional Disturbance does not appear to be significantly associated with level of children's arithmetic achievement in this group of OG.

TABLE 19

RESULTS OF CHI-SQUARE TESTS RELATING TO THE ASSOCIATION BETWEEN PARENTAL EMOTIONAL DISTURBANCE AND THE CHILDREN'S LEVELS OF ARITHMETIC ACHIEVEMENT.

YB	OB	YG	OG
N.S.	N.S.	N.S.	N.S.

N.S. = Not significant.

Table 20 gives a summary of all the above results pertaining to level of arithmetic achievement.

TABLE 20

SUMMARY OF THE RESULTS OF CHI-SQUARE AND FISHER TESTS RELATING TO LEVELS OF ACHIEVEMENT IN ARITHMETIC. (See also Appendix XXI)

	YB	OB	YG	OG
Parental Attitude				
N.		.05 <sup>R</sup>		
E.				
Perinatal distress				
Parental disturb.				

R Considering only a reduced sample.

C. CONTRIBUTIONS TO THE VARIANCE

In order to determine the relative weight with which each independent variable in Section A contributes to the criterion (reading and arithmetic attainment) the following regression equation was computed:-

$$Y = b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + K$$

where Y = obtained reading or arithmetic age.

X<sub>1</sub> = Parental Attitude

X<sub>2</sub> = C.A.

X<sub>3</sub> = I.Q.

X<sub>4</sub> = Neuroticism

X<sub>5</sub> = Extraversion

X<sub>6</sub> = Perinatal Emotional Distress

X<sub>7</sub> = Parental Emotional Disturbance

b<sub>1</sub>... b<sub>7</sub> = regression coefficients

K = a constant, (see page 114).

The calculations of this equation for each of the four groups of YB, OB, YG, and OG in both reading and arithmetic, and in reading for the Brain-injured Group, are reported in Appendix XV111.

These calculations yield a beta coefficient. R<sup>2</sup> can be expressed in terms of the beta and correlation coefficients:-

$$R^2 = \beta_2 r_{12} + \beta_3 r_{13} + \dots + \beta_n r_{1n}$$

R<sup>2</sup> gives the proportion of the variance of the criterion attributable to the joint action of the variables. As discussed in Chapter X111 it is possible to break down R<sup>2</sup> into the individual contribution each predictor variable makes to the variance. This is done for each variable by multiplying its beta coefficient by

its correlation coefficient and expressing the result as a percentage.

This section reports the contribution of each variable to the variance for each of the groups in both reading and arithmetic. Appendix XX outlines the relevant calculations.

### READING

#### Younger Boys (Reading)

39.4% of whatever makes this sample of YB differ in reading attainment can be attributed to the following individual contributions:-

I.Q.	18.4%
N.	6.5%
Parental attitude	5.4%
Perinatal distress	5.3%
E.	2.9%
C.A.	0.8%
Parental disturb.	0.1%

#### Older Boys (Reading).

61.4% of whatever makes this sample of OB differ in reading attainment can be attributed to the following individual contributions:-

I.Q.	44.7%
E.	9.9%
C.A.	4.4%
Perinatal distress	1.6%
Parental disturb.	0.6%
N.	0.2%
Parental attitude	-0.0

Younger Girls (Reading)

60% of whatever makes this sample of YG differ in reading attainment can be attributed to the following individual contributions:-

C.A.	30.8%
N.	12.3%
Perinatal distress	5.5%
I.Q.	5.3%
Parental disturb.	3.1%
Parental Attitude	2.2%
E.	0.8%

Older Girls (Reading)

58% of whatever makes this sample of OG differ in reading attainment can be attributed to the following individual contributions:-

I.Q.	48.2%
C.A.	8.3%
Perinatal distress	2.6%
E.	-1.5%
Parental attitude	0.7%
N.	-0.06%
Parental disturb.	0.01%

Table 11 summarizes the above results.

TABLE 21

INDIVIDUAL CONTRIBUTIONS TO THE VARIANCE (Reading)  
(See also Appendix XXI p.A115)

YB		OB		YG		OG	
Variable	%	Variable	%	Variable	%	Variable	%
I.Q.	18.4	I.Q.	44.7	C.A.	30.8	I.Q.	48.2
N.	6.5	E	9.9	N.	12.3	C.A.	8.3
P.Att.	5.4	C.A.	4.4	M.	5.5	M	2.6
M*	5.3	M	1.6	I.Q.	5.3	E	-1.5
E	2.9	D	0.6	D	3.1	P.Att.	0.7
C.A.	0.8	N	0.2	P.Att.	2.2	N	-0.06
D**	0.1	P.Att.	-0.00	E	0.8	D	0.01

\* M = Perinatal Emotional Maternal Distress  
\*\* D = Parental Emotional Disturbance.

ARITHMETIC

Younger Boys (Arithmetic)

Each variable contributes individually to the variance (49.9%) as follows:-

I.Q.	19.9%
C.A.	16.8%
Parental attitude	6.3%
Perinatal distress	2.6%
Parental disturb.	2.5%
E.	2.0%
N.	-0.3%

Older Boys (Arithmetic)

Each variable contributes individually to the variance (38.9%) as follows:-

I.Q.	24.8%
N.	7.4%
Parental Attitude	6.4%
Parental disturb.	0.2%
E.	-0.01%
Perinatal distress	-0.01%
C.A.	-0.01%

Younger Girls(Arithmetic)

Each variable contributes individually to the variance (63%) as follows:-

I.Q.	31.2%
C.A.	16.2%
E.	12.4%
Perinatal distress	7.0%
Parental attitude	1.9%
Parental disturb.	-4.4%
N.	-1.2%

Older Girls(Arithmetic)

Each variable contributes individually to the variance (47%) as follows:-

I.Q.	24.3%
C.A.	15.1%
Perinatal distress	3.8%
Parental attitude	2.5%
E.	1.5%
N.	-0.06%
Parental disturb.	0.001%

Table 22 summarizes these results

TABLE 22

INDIVIDUAL CONTRIBUTIONS TO THE  
VARIANCE (Arithmetic).

(See also Appendix XXI p. A115)

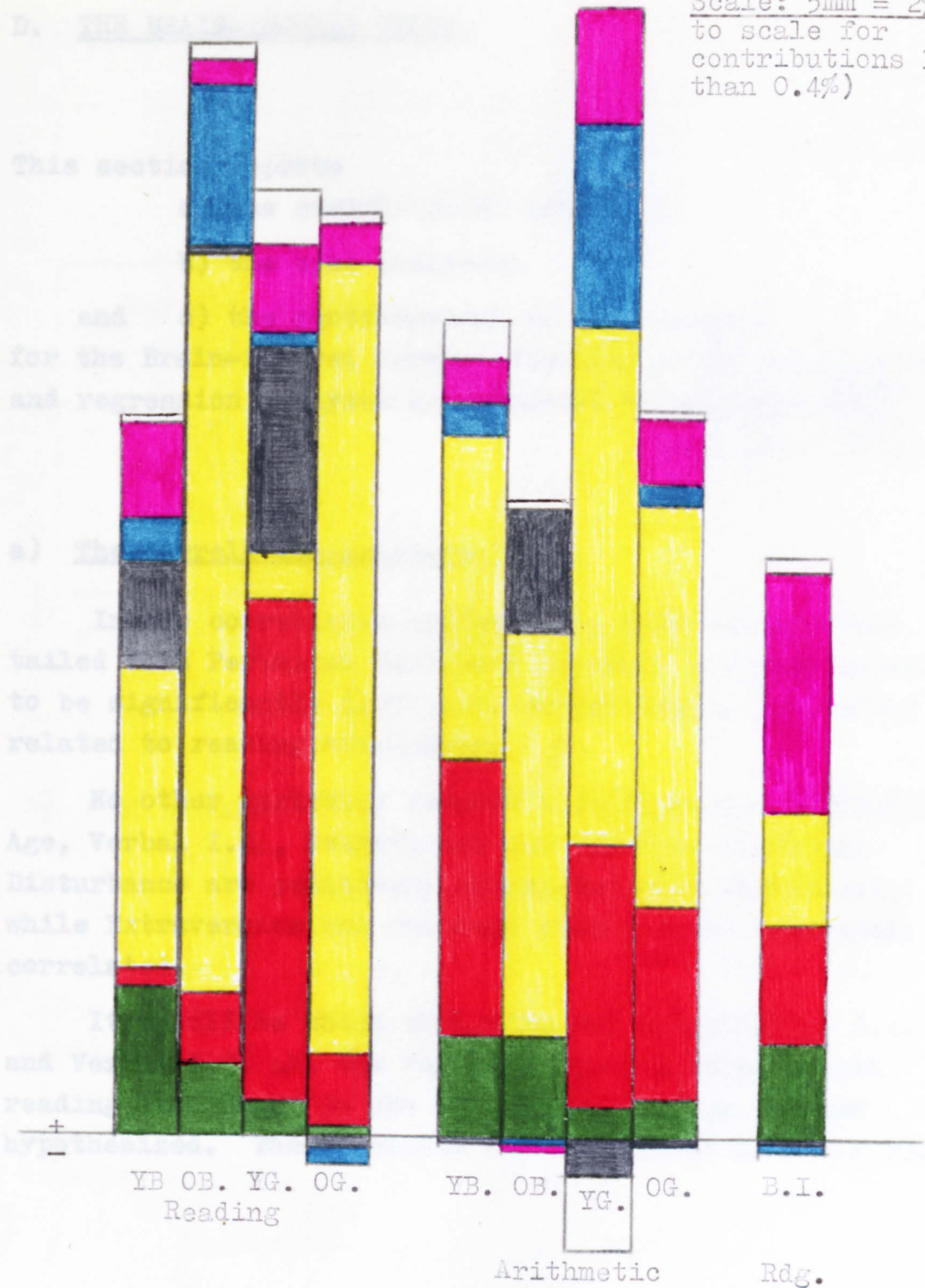
YB		OB		YG		OG	
Variable %		Variable %		Variable %		Variable %	
I.Q.	19.9	I.Q.	24.8	I.Q.	31.2	I.Q.	24.3
C.A.	16.8	N	7.8	C.A.	16.2	C.A.	15.1
P.Att.	6.3	P.Att	6.4	E.	12.4	N	3.8
M*	2.6	D	0.2	M	7.0	P.Att	2.5
D*	2.5	E	-0.01	P.Att.	1.9	E	1.5
E	2.0	M	-0.01	D	-4.4	N	-0.06
N	-0.3	C.A.	-0.01	N	-1.2	D	0.001

\*M = Perinatal Emotional Maternal Distress  
D = Parental Emotional Disturbance.

Figure I illustrates these contributions in the form of a bar diagram.

Figure 1 Bar diagram illustrating contributions to the variance.

Scale: 5mm = 2% (not to scale for contributions less than 0.4%)



P. Attit.
  C.A.
  I.Q.
  N.
  E.
  M.\*
  D.\*\*

\* M = Perinatal Emotional Maternal Distress.  
 \*\* D = Parental Emotional Disturbance.

D. THE BRAIN-INJURED GROUP.

This section reports

a) the correlational analysis;

b) the zone analyses;

and c) the contributions to the variance for the Brain-injured Group. Details of the correlation and regression analyses are reported in Appendix XV111 (pp. A96 - A97).

a) The correlation analysis.

In the correlation analysis (p. A96) using a two-tailed test Perinatal Emotional Maternal Distress appears to be significantly (.05) and, surprisingly, positively related to reading attainment.

No other variables reached significance. Chronological Age, Verbal I.Q., Neuroticism and Parental Emotional Disturbance are positively correlated with attainment, while Extraversion and Parental Attitude are negatively correlated.

It should be noted that with the exception of C.A. and Verbal I.Q. all the variables are correlated with reading attainment in the opposite direction to that hypothesized. These results are summarized in Table 23.

TABLE 23

SUMMARY OF THE CORRELATIONS OF THE VARIABLES  
WITH READING ATTAINMENT AMONG THE BRAIN-INJURED  
GROUP. (See also Appendix XXI)

Parental Attitude	-
C.A.	+
I.Q.	+
N	+
E	-
Perinatal distress	+ *
Parental disturb.	+

\* Significant at .05 level (two-tailed).

b) The zone analyses.

PARENTAL ATTITUDE

Of the 14 accepted children in the Brain-injured Group, 7 were underachievers, 4 were normals, and 3 were high achievers; of the 20 rejected, 3 were underachievers, 11 were normals, and 6 were high achievers. These cells were combined such that the normals were equally divided between the under and high achievers:

	Underachievers	High achievers	
Accepted	9	5	14
Rejected	8.5	11.5	20
	17.5	16.5	34 = N

$$\begin{aligned}
 \chi^2 &= 0.81 \\
 \text{d.f.} &= 1 \\
 P &> .05
 \end{aligned}$$

It appears that Parental Attitude is not significantly associated with different levels of achievement in reading in the group of brain-injured children.

### NEUROTICISM

Of the 17 high neurotics, 5 were underachievers, 9 were normals, and 3 were high achievers; of the 17 low neurotics, 5 were underachievers, 6 were normals, and 6 were high achievers. The normals were divided equally between the under and high achievers:

	Underachievers	Hi achievers	
Hi Neurotics	8	9.5	17.5
Lo Neurotics	9	7.5	16.5
	17	17	

$$\begin{aligned}
 x^2 &= 0.02 \\
 \text{d.f.} &= 1 \\
 P &> .05
 \end{aligned}$$

It appears that level of Neuroticism is not significantly associated with different levels of achievement in reading in this group of brain-injured children.

### EXTRAVERSION

Of the 17 extraverts, 4 were underachievers, 8 were normals, and 5 were high achievers; of the 17 introverts 6 were underachievers, 7 were normals and 4 were high achievers. The normals were divided equally between the under and high achievers:

	Underachievers	Hi achievers	
Extraverted	8	9	17
Introverted	9.5	7.5	17
	17.5	16.5	34 = N

$$\begin{aligned}
 x^2 &= 0.02 \\
 \text{d.f.} &= 1 \\
 P &> .05
 \end{aligned}$$

It appears that level of extraversion is not significantly associated with level of reading achievement in this group of brain-injured children.

#### PERINATAL EMOTIONAL MATERNAL DISTRESS

Of the 11 children in the distressed group, 1 was an underachiever, 6 were normals, and 4 were high achievers; of the remaining 23, 9 were underachievers, 9 were normals, and 5 were high achievers. The normals were divided equally between the under and high achievers:

	Underachievers	Hi achievers	
Distressed	4	7	11
Not distressed	13.5	9.5	23
	17.5	16.5	34 = N

$$\begin{aligned}
 x^2 &= 0.72 \\
 \text{d.f.} &= 1 \\
 P &> .05
 \end{aligned}$$

It appears that Perinatal Emotional Maternal Distress is not significantly associated with level of reading achievement in this group of brain-injured children.

PARENTAL EMOTIONAL DISTRESS

Of the 13 children in the distressed group, 4 were underachievers, 5 were normals, and 4 were high achievers; of the 21 remaining, 6 were underachievers, 10 were normals, and 5 were high achievers. The normals were divided equally between the under and high achievers:

	Underachievers	Hi achievers	
Disturbed	6.5	6.5	13
Not disturbed	11	10	21
	17.5	16.5	34 = N

$$\begin{aligned}
 x^2 &= 0.04 \\
 \text{d.f.} &= 1 \\
 P &> .05
 \end{aligned}$$

It appears that Parental Emotional Distress is not significantly associated with level of reading achievement in this group of brain-injured children.

These results are summarized in Table 24

TABLE 24

SUMMARY OF CHI-SQUARE TESTS RELATING TO LEVELS  
OF ACHIEVEMENT IN READING AMONG THE BRAIN-INJURED  
GROUP. (See also Appendix XXI pA114)

Parental Attitude	N.S.
N.	N.S.
E.	N.S.
Perinatal distress	N.S.
Parental disturbance	N.S.

N.S. = Not significant

---

c) Contributions to the variance

Using the same equation as outlined in Section C of this chapter it was found that each variable contributes individually to the variance (35%) as follows:-(1)

Perinatal distress	14.4%
C.A.	6.9%
I.Q.	6.6%
Parental Attitude	6.1%
Parental disturb.	0.7%
E.	0.2%
N.	0.1%

However the F - Ratio in the analysis of variance equals 1.96 (d.f.<sub>1</sub> = 7, d.f.<sub>2</sub> = 26). This is not significant. Thus while the magnitude of the relation ( $R^2$ ) is .35 little more can be said of it, and conclusions cannot be drawn.

---

(1) Figure I (p. 164a) illustrates these contributions in the form of a bar diagram.

PART FIVE

RESULTS AND DISCUSSION.

INTRODUCTION

At this point a reminder may be useful about the types of analyses employed. These were

- (1) a correlation analysis dealing with the correlation between reading and arithmetic attainment and Parental Attitude, C.A., Verbal I.Q., Neuroticism, Extraversion, Perinatal Emotional Maternal Distress, and Parental Emotional Disturbance. Attainment here was defined as the obtained reading and arithmetic ages of each child.
- (2) A zone analysis in which goodness - of - fit techniques were used to determine the degree of association between levels of reading / arithmetic achievement (underachieving, normally achieving, and high achieving) as predicted from a regression equation using C.A. and Verbal I.Q. as the predictor variables, and the five major variables - Neuroticism and Extraversion divided into different zones, Parental Attitude, Perinatal Emotional Maternal Distress and Parental Emotional Disturbance.
- (3) A multivariate regression analysis using the five major variables plus C.A. and Verbal I.Q. to determine each of the seven variables' individual contribution to the variance.

The results are discussed in the following manner:-

- (1) for each of the five major variables, the correlations with reading and arithmetic attainment, and the zone analysis of these variables with different levels of achieving in reading and arithmetic, are taken together for the four main groups of YB, YG, OB, and OG:
- (2) there follows a similar discussion of the results of the Brain-injured Group with reading only;
- and (3) this is concluded by a discussion concerning the individual contributions to the variance of all the variables used for all groups excepting the Brain-injured Group. In this latter group such discussion was invalidated because the F - Ratio computed in the analysis of variance did not reach significance.

Each part of the discussion follows a similar pattern - a summary of the results; the relationship of these results to those in the literature; and at times these results as they may be seen in the wider context of educational psychology as a whole.

Except when stated all the results are to be found in tabular summary in Appendix XXI. (pp. A114-A115)

CHAPTER XV11

THE RELATIONSHIP BETWEEN THE PARENTAL ATTITUDES  
OF ACCEPTANCE AND REJECTION AND READING AND  
ARITHMETIC ATTAINMENT; AND DIFFERENT LEVELS OF  
READING AND ARITHMETIC ACHIEVEMENT.

In this research Acceptance and Rejection were defined in accordance with the 'syndrome' suggested by NURSE (1964), and supported by BOSSARD and BOLL (1966) and by GARRISON et al (1968). Acceptance includes such attitudes as democracy in the home, permissiveness and tolerance; Rejection includes parental authoritarianism, overprotection, neglect, and inconsistent and severe discipline.

Table 25 gives a tabular summary of the results of the correlation and zone analyses relating to parental attitude.

TABLE 25

SUMMARY OF RESULTS OF CORRELATION AND ZONE  
ANALYSES RELATING TO PARENTAL ATTITUDE

	READING				ARITHMETIC			
	YB	OB	YG	OG	YB	OB	YG	OG
Correlations	+ .025	+	+	+	+ .05	-	-	+
Zone analyses	.02		.01					

The significant and positive findings that among YB parental Acceptance is correlated with attainment in reading and arithmetic; and that among YB and YG Acceptance is associated with achievement and Rejection with underachievement in reading when I.Q. and C.A. are controlled, support the results reported in the literature,

upon which the research hypothesis was based. KURTZ and SWENSON (1951), HIMMELWEIT (1955), HAGGARD (1957), and LYTTON (1968) reported that a supportive, accepting parental attitude was the best way to produce school achievers. DE HAAN and HAVIGHURST (1961), SHAW and DUTTON (1962), and PEPPIN (1963) are typical of those who suggest that parents of underachievers impede their children's progress by having consistent negative attitudes towards, and by being critical of, their children. HATTWICK and STOWELL (1936), SPERRY et al (1958), and HALL (1966) all produced convincing evidence that overprotection is associated with scholastic underachievement. Those homes in which punishment is the principle vehicle of discipline were found by GREENACRE (1949), HALL (1966), and LYTTON (1968) to have children who tend to underachieve, while those homes in which reward is the fulcrum tend to have children who achieve in school.

BIGLIN (1964) reported little success in relating parental attitude to children's achievement when I.Q. and socio-economic class were held constant. The results in the zone analyses in the present study, however, show a very significant relationship between Parental Attitude and level of achievement among both the YB and the YG, though no such relationship appears among the older children.

So strongly does the literature support significant correlations between Parental Attitude and school performance that the question must be asked, "Why are so few significant correlations seen in this study?" Two speculative arguments may be put forward:

(1) do the children themselves perceive Parental Attitudes differently from the judges?

and (2) is there some factor or factors common to both clusters of Acceptance and Rejection used here which may predispose away from the expected direction of attainment?

(1) In considering the perception of parental attitudes there are three points of view:

- (a) parental attitude as perceived by people outwith the family - as in the present study;
- (b) parental attitude as perceived by the parents - as derived from such questionnaires as Oppenheim's Parent Attitude Inventory and Schaeffer and Bell's Parent Attitude Research Instrument; (Chapter XI );
- and (c) parental attitude as perceived by the children themselves, as in the Bene - Anthony Family Relations Test.<sup>(1)</sup>

Do the children perceive their parents' attitudes towards themselves differently from the way in which adults - either the parents themselves or the outside workers - perceive such attitudes?

The last thirteen children who were tested in this study were asked the following question appended at the administration of the J.E.P.I. - "If you did something wrong - something that you know your parents would not like you to do - and your parents found out, would you feel that they were really on your side - trying to help you - or not?" Those who answered "yes" were taken to perceive their parents as "Accepting", those who answered "no" were taken to perceive their parents as "Rejecting". The following is a table of the results of this question and of the judges' categorizations of the parental attitude:

---

(1) This test assesses a child's subjective experience of inter-personal relationships within his family. The results indicate the relative psychological importance that various members of his family have for the child; the nature of the feelings he has for them and believes that they have for him whether positive, ambivalent or negative, unilateral or reciprocated, or whether inhibited or of exaggerated intensity. (Remarks taken from N.F.E.R. "Catalogue of Tests" 1973 p.38)

TABLE 26

CHILDREN'S AND JUDGES' CATEGORIZATION OF  
PARENTAL ATTITUDES.

YB		OB		YG		OG	
Child's Rating	Judges' Rating	Child's Rating	Judges' Rating	Child's Rating	Judges' Rating	Child's Rating	Judges' Rating
R	R	R	R	A	A	A	R
R	A	R	A	R	A	R	A
R	R	A	A			A	R
		A	R			A	A

A = Accepting

R = Rejecting

In this extremely small sample there is a discrepancy between the children's and judges' ratings. Among YB it is in the order of 33%; OB, 50%; YG, 50%; and OG, 75%. Obviously no firm conclusion of any kind can be drawn from this table - sufficient to suggest however that a) the measurement of the child's perception of parental attitude may be important and b) the discrepancy is lowest among YB - the only group in this study in which the relationship between parental attitude and reading/ arithmetic attainment reaches significance.

(2) That there is little significant association between parental attitudes and reading/arithmetic attainment may suggest that the criteria used in this study - the Nurse clusters of Accepting and Rejecting - need not be mutually exclusive, i.e. it may be that there is some factor or factors common to both clusters of attitudes which predispose and tend toward non-expected levels of performance. DE HAAN and HAVIGHURST (1961) suggested that need for achievement is the factor which causes the large amount of variation in attainment found within any given intelligence level. Need for achievement is the motivation which involves performance in the context of standards of excellence and is the desire to have the performance well evaluated against such standards.

Could high need for achievement be common to both clusters of Accepting and Rejecting attitudes? BROWN (1967) states that in McLelland's (1953) hypothesis the history of someone who has high need for achievement must be one of competition with performance standards, or one in which the individual was expected by himself to do things well. Such a type of history does not appear to rule out either Accepting or Rejecting parental attitudes as they are defined in this study.

High need achievement in the children of those parents who in this study might be classified as accepting parents is reported by ROSEN and D'ANDRADE (1959). They showed that children whose mothers were striving, competent, who had high expectations, and who encouraged and rewarded them, had high need achievement. WINTERBOTTOM (1958) also reported that mothers of children with high achievement motivation differed from mothers of children with low achievement motivation in that the former made more demands for independence and achievement, and gave more intense and frequent rewards.

Regarding parents who might be classified as rejecting in this study, MCLELLAND (1953) concluded that it is the individuals who see their parents as distant, severe, and unfriendly, who have high need achievement scores. Again D'HEURLE et al (1959) found positive correlations between parental overprotectiveness (categorized here as Rejection) and arithmetic, reading, and general achievement scores.

MCLELLAND posits that there are two principal motives or tendencies in need for achievement. These are approach, the disposition to approach success, and avoidance, the disposition to avoid failure and humiliation. This, as MADSEN (1968 p.227) puts it, is "a modern reformulation of classical hedonism". Any situation which presents a challenge to succeed must, by its very nature, present the alternative threat of failure. Therefore achievement-oriented behaviour must always be influenced by the approach - avoidance, or as McLelland calls it, the "hope-of-success", "fear-of-failure" conflict. Motivation is positive when "hope-of-success" exceeds "fear-of-failure". When the opposite is the case, the child may try to avoid achievement related activity, though total avoidance is rarely possible in scholastic achievement situations. "Fear-of-failure" is seen as an integral part of the achievement motive; it is an inhibitory tendency.

It appears therefore that need for achievement with its attendant subdivisions "fear-of-failure" and "hope-of-success" may be common to both attitude syndromes used in this study. The result in the study of only a few significant relationships between parental attitude and children's achievement may be a function of this commonality. What may be significant in scholastic achievement or underachievement need not be the parental attitudes per se as posited in the hypothesis of this research, but it may be parental attitudes combined with such factors as independence training, rewards, and demands for high standards in the children.

Some wider implications

The results have shown that the attitude of the parents is related to level of achievement in reading among the younger boys and girls but not among the older children. However not all younger boys and girls who were normals or high achievers were accepted, nor were all who underachieved rejected.

Clearly a good emotional tone in the home is important for success in school particularly among younger children. The more interesting implication, however, may well be in the interaction of this emotional tone between home and school.

Need for achievement may be cognate with affection seeking within the child such that the child of accepting parents fulfils his parents' demands in order to get affection, and that the child who is rejected has no sense of fulfilment in the home. Erikson has described the junior school stage as one of comparative stability which is devoted to the child's becoming equipped with the basic cultural skills. The child however, still fears he is incomplete and this results in the conflict between the sense of industry and the sense of inferiority. He begins to identify, to form group relationships. He greatly values the loyalty of and to friends, by which he can measure and judge his own success and failure. If his sense of achievement is satisfied, his sense of inferiority will correspondingly diminish. Thus the rejected child on the one hand may be unable to fulfil an affection need within his home and on the other hand may be faced with the achievement - inferiority conflict in school. SCHAFFER and EMERSON (1964) reported that one third of their infants projected attachment behaviour on to someone not their principal caretaker (in the present study the principal caretaker is taken to be the parents). The rejected child in this study may well project a similar attachment behaviour on to an understanding teacher in order to fulfil both his need for affection and his need for achievement. Thus the rejected child who is a good achiever may be so in spite of his parents' attitudes to him at

home and because of his being able to realize, within the school, previously unfulfilled needs. In the same way the low achiever who is accepted at home may find the good work of the home undone by a school situation which makes too great demands on the work ethic and which thus deprives him of a sense of achievement.

As a corollary to this, schools which do not provide an atmosphere in which a child can feel himself to have achieved something would appear to be in a category cognate with the rejecting non-rewarding parents. Such schools in effect may be contributing to the child's underachievement. Such a suggestion lends weight to that concerning a more therapeutic approach towards underachieving children mentioned later in relation to the possible build up of frustrations within certain of these children.<sup>(2)</sup>

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(2) President Nixon in his Education Message of March 1970 cautiously summarized the findings from all compensatory programmes at that time saying "... the best available evidence indicates that most of the compensatory education programs have not measurably helped poor children catch up". (Quoted by JENSEN 1973 p.5) Intervention programmes such as Headstart and those of DEUTSCH (1962), and BEREITER and ENGELMANN (1966), and performance contracting, emphasize the stimulation of cognitive achievement. It is possible that in doing so they do not attend to the emotional needs of the children as well as they might and this lack of emphasis may lead to counter - productivity.

It can be seen from Page's conclusion concerning the effects of performance contracting, given below, that the child's emotional development appears conspicuously absent. "Many of us have believed, implicitly, something like this Applied psychology has certain powerful behavioural skills. We understand task analysis; input repertory; stimulus shaping; response elicitation; the provision of reinforcement; the arrangement of repetition, sequencing, looping; concept formation; the practicing of transfer. These are important ingredients in learning and as psychologists we understand these things much better than traditionally trained teachers. If we as a profession are given the support, the students, the autonomy, we can make incalculable improvements in education.

This belief has been one cornerstone in our faith in ourselves.

Now the [U.S. Office of Economic Opportunity] has provided what may be the first really solid test of its truth - whether the present, state-of-the-art, garden-variety, applied psychology can in fact contribute to the most important learnings in the schools. We will not make those statements so casually in the future. Our skills in training do not seem the immediate solution to our problems in education". PAGE 1972. (Quoted in JENSEN, 1973, p.7).

The overall finding in this study concerning the relationships between the attitudes of parents towards their children and the children's school performance is that among the younger boys and girls Acceptance is associated with good reading achievement, and Rejection with under-achievement in reading. Acceptance is related to attainment in reading and arithmetic among YB. The arguments put forward tentatively suggest that the children's perceptions of the attitudes of their parents be considered, as also should be the children's emotional interaction between at once both parent and school.

CHAPTER XV111

THE RELATIONSHIP BETWEEN STABILITY - NEUROTICISM AND  
ATTAINMENT, AND DIFFERENT LEVELS OF ACHIEVEMENT IN  
READING AND ARITHMETIC.

In this research Neuroticism and Extraversion were measured by the J.E.P.I. Eysenck's theory predicts that there is a positive relationship between high neuroticism and underachievement, and between stability and achievement. Based upon this it was hypothesized that children unsuccessful in reading and arithmetic would score high on neuroticism and those in the achieving or high achieving categories of reading and arithmetic would be low on neuroticism (at the "stable" level here).

Table 27 gives a tabular summary of the results of the correlation and zone analyses relating to the association between Neuroticism and attainment, and levels of achievement, in reading and arithmetic.

TABLE 27

SUMMARY OF RESULTS OF CORRELATION AND ZONE  
ANALYSES RELATING TO NEUROTICISM.

	READING				ARITHMETIC			
	YB	OB	YG	OG	YB	OB	YG	OG
Correlations	+ .05*	-	+	-	+	-	-	-
Zone analyses	.01		.02 <sup>*R</sup>			.05 <sup>R</sup>		

\* In opposite direction to hypothesis

R When only a reduced sample is considered

The finding that there was no relationship between Neuroticism and reading or arithmetic attainment in seven out of eight correlations agrees with a minimum number of studies such as WIRT and BROEN (1956), KITANO (1960), and L'ABATE (1960), and lends weight to the findings of WRIGHTSMAN (1962) who, dealing with teacher-training students in Tennessee under stress and non-stress examination conditions, concluded that anxiety is unrelated to performance if a test is seen to be of little importance, but when the test is personally important anxiety impairs performance. Again, CARON (1966) found the same with high school pupils working under "curiosity" and "examination" conditions. SAVAGE (1966) who had found a low positive but non-significant relationship between arithmetic and anxiety also suggested that where there is no untoward anxiety, results may be unusual. The circumstance in which the present tests were given - one of non threatening acceptance in which no arbitrary standards are to be reached - may approximate the non-stressful condition of the above studies.

The positive correlations among YB and YG in reading are considered later. Five of the remaining six while non-significant were negative. This negative association is in agreement with the findings of McCANDLESS and CASTANEDA (1956), NICHOLSON (1958), MORGAN et al (1960), BUTCHER et al (1963), LUNNEBORG (1964), COX (1964), COWEN et al (1965), STEVENSON and ODOM (1965), RUSHTON (1966) ENTWHISTLE and CUNNINGHAM (1968), and FROST (1968), all of whom dealt with children of ten years and over, except Cowen et al who confined their study to nine year olds.

The finding of a negative association between reading attainment and Neuroticism among OB and OG, and between arithmetic attainment and Neuroticism among YG, OG, and OB (reinforced by the finding in the zone analysis of a significant (.05) association between high neuroticism and underachievement in arithmetic among OB when only under and high achievers are considered,) complements the Iowa school - Spence, Taylor, and Farber - who incorporate

anxiety within the framework of Hullian theory and conceive of it as an emotionally based drive. Their model is one in which anxiety inhibits performance as a function of a) the complexity of the task to be learned; b) the strength of the drive; and c) the dominance of one response tendency over another. Thus, though they predict that in simple learning where only one response is involved, the highly anxious children will be more successful than those low in anxiety, they also predict that in a complex task, such presumably as reading and arithmetic, (this point about complexity will be taken up later), there are several competing responses and high anxiety will tend to combine multiplicatively with an incorrect response. Consequently, highly anxious children will be poorer at reading and arithmetic than those children low in anxiety, as is evidenced in much of this research.

This finding is also in accord with the theories posited by the Yale school of Sarason and Mandler. The higher the anxiety the more likely it will be that the child will make task irrelevant reactions which tend to disrupt performance, rather than task relevant performance facilitative reactions. In this view, the highly anxious child has self-deprecatory attitudes (evidenced in such studies as those of LIPSITT (1958), ROSENBERG (1953), and SUINN and HILL (1964) - inadequacy, fear of failure, a desire to quit the situation - and anticipates future failure being "more aware of his own covert responses than he is of the external stimulus situation", and thus this attitude "narrows considerably the perception of the external field and prevents a dispassionate assessment of the nature of the problem - solving task". (SARASON et al 1960). Anxiety interferes with the child's attending to the task in hand. The greater the anxiety, the greater the interference, and so, as here, the poorer the performance.

Considering, however, the zone analyses, the positive and significant (.01) relationship found between Neuroticism and reading among YB and the .02 relationship among the reduced sample of YG is not at all in accord with the literature,<sup>(1)</sup> which on this age group (7 to 9.4 years) is quite meagre. COWEN et al (1965) in their study of nine year old boys and girls reported negative correlations between reading and arithmetic and anxiety in all but one of their groups of girls (in which group the correlation was not significant); and SAVAGE (1966) studying children aged seven to nine years also reported a negative correlation. WARBURTON in a personal communication to FINLAYSON (1970) writes of his review of studies considering Cattell's 16 P.F. and Eysenck's personality measures that "Up to the age of 15, anxiety is never an advantage, but at later ages, it is so in 24 out of 34 cases".

The results of the zone analyses in this study suggest that age grouping might play an important part in the interaction of Neuroticism and reading. They suggest that younger boys<sup>(2)</sup> and possibly younger girls (C.A. 7 - 9.4 years) like the older children (C.A. 15+ years) in such studies as those by FURNEAUX (1957), LYNN (1959), and GIBBONS and SAVAGE (1965), who have higher Neuroticism scores tend towards reading achievement, while the more stable mid-group (C.A. 9+ to 15 years) achieve in reading better than the less stable in this group. Thus as a function of age there may be a "u" shaped relationship between Neuroticism and performance in such an activity as word reading, such that under nines with high neuroticism are good achievers,

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(1) Both BURT (1937) and LYNN (1957) suggested that highly anxious children would overachieve in reading; and JASTAK (1941) and CHAZAN (1962) noticed that neurotic children were frequently overachievers in reading.

(2) In this study the eight and nine year old boys and the eight year old girls are significantly (.01) higher in Neuroticism than the norms (Appendix X p.A44).

9 + to 15s with high neuroticism are poor achievers, and over 15s with high neuroticism are good achievers. These findings here cannot readily be generalized but they do argue that further studies of the under nines be undertaken.

Some wider implications.

It may further be argued from this result that, since in the younger children (certainly the boys) there is a positive association between Neuroticism and reading achievement the learning tested in reading here is not complex but simple learning. Theorists, as has been shown, agree that neuroticism is an aid towards simple (single response) learning, but when neuroticism becomes too high it detracts from performance in complex learning. However, as NAYLOR (1972 p.63) points out it is hard to determine difficulty levels for individual children. Word recognition is certainly complex in the infant school demanding phonic analysis and synthesis. If word recognition be complex in the infant school and simple when related to the higher-order skills<sup>(3)</sup> taught in the junior school, and assuming that infant school tasks are continued into the lower years of junior school for some children, then a positive association between Neuroticism and reading-as-a simple-skill is explained in terms of the Iowa, Yale, and Eysenckian theories; but, if this be the case, the discussion above relative to the negative association found in this study among older children, based as it is on the assumption that the reading measured here is a complex skill, is invalid. That is, if such reading be simple learning then we would expect a positive, not a negative association, as was found, equally in the older as well as the younger groups of children in this study.

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(3) Higher order skills consist of such skills as following directions; finding information; reading to remember; associating ideas and materials; organizing ideas and materials; increasing speed of silent reading; and improving oral reading.

Perhaps it would appear improbable to suggest that what is a simple skill for a seven to nine year old becomes a complex skill later. It may, however, be suggested from these results, that while the act itself of word recognition remains simple for the seven to nines, age may bring complications within the child.<sup>(4)</sup>

It may not, therefore, be improbable to argue that the results in this study lend strength to the suggestion that, as they grow older, children develop an emotional set against reading. This is not simply a set against the primary skills. No matter whether word recognition be simple or complex to the seven to nines, it comes to be looked upon by certain older children, those who have accumulated side effects, (children who are most likely to be under stress as those in this study), as a complex, or even more complex skill. Such a consideration would therefore support Mandler and Sarason's approach that anxiety affects achievement as a function not of the task's characteristics, but as a function of the subject's characteristics.

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(4) MONROE and BACKUS (1937) reported that predilection against reading is a primary emotional factor in reading retardation, and ROBINSON (1946) commented that unpleasant or indifferent associations with words may hamper the reader. "It seems evident" she wrote, "that emotional difficulties may cause reading disability in the beginning and that this disability may in turn result in frustration. The interaction and intensification become a vicious circle, leading to intense emotional maladjustments and complete failure to progress in reading". GAUDRY and SPIELBERGER (1971) say that complex learning tasks are cumulative in nature and knowledge and understanding of them are built up over a period of years. VERNON (1971) considers that "If...the child has not progressed to a stage where he himself feels he is beginning to read with fair efficiency by the beginning of the 3rd year of junior school, he becomes less and less willing to try to learn as the years go by. His whole attitude to school work in general changes as he finds that reading weakness retards his progress in practically every other part of the school programme. His confidence in his own ability is weakened and his self respect is threatened". MERRITT (1972) pinpoints this cumulating effect "Many children... build up a ballast of errors that sinks them forever as far as educational achievement is concerned". BULLOCK (1975 p. 245) says that "...once he has begun to falter and is allowed to continue struggling unaided, he is less and less likely to make sound progress."

CHAPTER XIX

THE RELATIONSHIP BETWEEN INTROVERSION - EXTRAVERSION AND  
ATTAINMENT AND DIFFERENT LEVELS OF ACHIEVEMENT IN  
READING AND ARITHMETIC.

The hypothesis here was based not on Eysenckian theory which posits that high achievers should be low on extraversion, but on empirical studies of primary school children, which tend in the opposite direction - that extraverts in primary school are better achievers.

Table 28 gives a tabular summary of the results of the correlation and zone analyses relating to the association between Extraversion and attainment, and levels of achievement, in reading and arithmetic.

TABLE 28

SUMMARY OF RESULTS OF CORRELATION AND ZONE  
ANALYSES RELATING TO EXTRAVERSION

	YB	OB	YG	OG	YB	OB	YG	OG
Correlations	+ .05	- .02*	+	+	+	+	-	+
Zone analyses		.02*						

\* In opposite direction to hypotheses.

The non-significant results support CALLARD and GOODFELLOW (1962), who found no relationship between Extraversion and performance.

Among the YB there was a positive and significant (.05) correlation between Extraversion and reading. Although non-significant the direction of 5 of the remaining 6 correlations (excluding OB discussed later) being positive is, as is the YB result, in accordance with such studies concerning school children as BANKS (1963),

BUTCHER et al (1963) RUSHTON (1966), SAVAGE (1966), RIDDING (1967) EYSENCK and COOKSON (1969), and WILSON (1972) as opposed to studies of students in tertiary education which in general agree with the Eysenckian hypothesis that introverts perform better scholastically than extraverts.

The significant (.02) association found in the zone analyses between introversion and normal and high achievement in reading among OB is not in accordance with the hypothesis formulated from the bulk of empirical studies, but it is in agreement with the findings of CHILD (1964) who used a zone analysis approach, and also with ENTWHISTLE and CUNNINGHAM (1968) dealing with twelve and thirteen year old boys and girls. They reported that their introverted boys were higher achievers than extraverted boys, and also, as was found here, that there was a positive relationship between high achieving and Extraversion in girls.

This finding that Introversion is significantly associated with achievement in reading, is also in accordance with Eysenckian theory derived from Pavlov's and Hull's concepts of cortical excitation and inhibition. Excitation refers to cortical processes - of unknown character - which facilitate cognitive processes while inhibition reduces the efficiency of these processes. Using these concepts Eysenck hypothesizes that introverted behaviours result from a tendency to generate reactive inhibition slowly, to a low degree, and to dissipate it quickly; extraverted behaviours result from a tendency to generate inhibition quickly, to a high degree, and to dissipate it slowly. To clarify any possible confusion as to the meaning of cortical inhibition EYSENCK (1964 b) writes "Cortical inhibition is stronger in extraverts, but this should not be confused with inhibited behaviour, which is characteristic of introverts. Cortical inhibition,

to put it crudely, inhibits the higher centres, whose major role is the inhibition of outgoing, instinctual activity; it thus acts as a disinhibitor of behaviour".(p.87) As the extravert applies himself to the task, inhibition rapidly builds up and soon, compared with the introvert, this inhibition detracts from the extravert's attending to the task. On the other hand, having much less inhibition generated in the course of his activity, the introvert is able to work for a longer period - and more consistently. Thus Eysenckian theory predicts that extraversion militates against, and introversion facilitates, performance.

#### Some wider implications.

Although the finding here regarding reading among the OB lends weight to Eysenck's theory, and although empirical studies such as those by LYNN (1959), BENDIG (1960), SAVAGE (1962), GIBBONS and SAVAGE (1965), and KLINE (1966) lead to the conclusion that the theory is true in the tertiary education sector, there is nevertheless evidence, already cited, suggesting it is not true in the school sector.

If it be true, as FURNEAUX (1957) suggests, that at school the tendency of the extravert to dissipate his energies is held in check, this checking may help to explain the non-functioning of Eysenckian theory among the other groups in this study. Eysenck suggests that, if he builds it up at all, the extrovert tends quickly to dissipate excitatory energy, and the introvert is slow to dissipate such energy. In the tertiary education sector there is little to restrict this predicted course of events. The atmosphere in this sector is much 'freer' than the atmosphere in school. Because in the tertiary sector motivation for success is primarily internal; because the student is restricted by few external checks and pressures, the persistence factor attributed by

Eysenck to the introvert, the factor which ALEXANDER (1936), VERNON (1961) and LYNN and GORDON (1961) deemed of great importance to scholastic performance, may make a significant contribution in carrying the introvert to higher achievement than the extravert whose excitatory energies, unchecked, are quickly dissipated. The pupils in the primary school, the children in this study whose stress symptoms are likely to bring them to the attention of the teacher perhaps more so than other primary children, are restricted by a number of external checks and pressures centring around the constant invigilation and demands by the teacher pressing towards acceptable minimum work and socialization norms. These checks and pressures may contain and slow down the dissipation of cortical excitation in the extravert by canalizing his energy along the paths required of scholastic performance. It may justifiably be assumed that children under stress are in the front line in the classroom for just such checks and pressures and these will go at least some way towards

allowing the extravert to achieve. This would explain in part why among these groups of younger children and Older Girls the Eysenckian theory is not upheld.

There would appear also to be a coincidence of coping behaviour and school practice which would allow the introverted child to do well in reading. The coping behaviour of the introverted older boy<sup>(1)</sup> and this should equally be true for the older girl though it does not appear to be so here would appear to be withdrawal from a stressful situation and the finding of solace in books. The SHANKS (1965) and PLOWDEN (1967) Reports describe and advocate school situations where the virtue of persistence - typical of the introvert - is helped to flower and so allow the introvert to pursue his interest in depth. Thus the coping behaviour of the introvert and the school situation are at one in helping his reading.

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(1) EYSENCK and RACHMAN (1965) describe the introvert as "the quiet, retiring, introspective...fond of books rather than people" child.

Most teachers would concur in some measure with the Rosenthal effect; they would almost certainly agree that the more sociable outgoing child-the extravert-gains more of their attention than does the more withdrawn introverted child.(Studies by WICKMAN (1928) and HOLLINS (1955) comparing teachers' and clinicians' ratings of maladjustment is indirect evidence of this). It seems that this type of interaction between teacher and child is the basis of a more probable interpretation of the results here of mainly positive associations between extraversion and attainment than is the unknown cortical processes of Eysenck. Extraverts are more dependent on an outside relationship; they demand more of the teacher's time and attention, therefore, there is greater interaction between these children and their teachers than there is between introverts and teachers, assuming a normal classroom situation. This greater interaction is to the advantage of the extravert particularly in the infants' department and early years of junior school. This interaction has a two - way effect - helping the young extravert in this study by attention to his needs, and not helping the young introvert by the teacher's attention being diverted from him.

However it may be too that the older introverts, as instanced by the OB in this study, are more self motivated and have their own idea of self. The introvert prefers a more "paper and me", a less "face to face" situation. He resents a third party-the teacher is looked upon as an intrusion. Thus the introverts among the OB may be able to work more fruitfully when left to themselves, requiring only a minimum of guidance.<sup>(2)</sup> The results in this study suggest this as an alternative explanation to Eysenck's.

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(2) Why should not the introverts among the OG show the same trend? The remarks of MILGRAM (1974) when speaking of women as subjects in his obedience to authority experiments may be suggestive. He says that women can be expected to be less aggressive, more obedient and more empathic than men. (P.63). Thus we might expect the OG - introverts or not - still to need more teacher interaction than the OB.

CHAPTER XX

THE RELATIONSHIPS BETWEEN PERINATAL EMOTIONAL  
DISTRESS AND PARENTAL EMOTIONAL DISTURBANCE,  
AND ATTAINMENT AND LEVELS OF READING AND  
ARITHMETIC ACHIEVEMENT.

In any discussion concerning characteristics in these children subsequent upon emotional distress to the mother during pregnancy and parental emotional disturbance, two things must be emphasized - a) these children may constitute a biased sample, and b) the data dealt with are "soft" and open to such selection and distortion as are discussed in YARROW'S (1963) paper "Problems of Methods in Parent-Child Research" already referred to.<sup>(1)</sup>

A. PERINATAL EMOTIONAL MATERNAL DISTRESS.

Evidence has been led by DAVIDS et al (1963) that the level of intelligence would be predictably lower and emotionality more labile in children whose mothers have undergone emotional stress during and around pregnancy. WALLIN and RILEY (1950), ROGERS et al (1955), TURNER (1956), FERREIRA (1965), and SONTAG (1966) suggest an association between such stress and later behaviour and achievement in the child.

No significant association has been found in the present study either among the correlations or in the zone analyses between Perinatal Emotional Distress and the child's reading and arithmetic attainment or achievement in any of the four main groups.

While no firm conclusions can be drawn from these results two points can be considered:

- (1) the age of the child;
- and (2) the level of stress.

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(1) Chapter XI.

(1) The age of the child.

CURTIS et al (1955) found that of their mothers who had symptoms of stress during pregnancy some 59% lost these symptoms after the process of childbearing was complete. PLESSETTE et al (1956) found that anxieties were always present in pregnancy, labour and the puerperium, but these had mostly been resolved by six weeks after birth. Turner's children were very young, seven to ten days old; David et al's were eight months, and Sontag's thirty months. Evidence of longitudinal studies in this field, whereby a group is studied in infancy, childhood, adolescence and adulthood, is not readily available. That promised by DAVIDS et al (1963) does not appear to have been realized; ADAM'S (1963) study of 132 high school students relying as it does on four anxiety questionnaires does not appear to deal with less 'soft' data than here. However, it can be seen from a tabulation of four animal studies using the Thompson technique (Table 29) that those rats whose emotionality in childhood is described as being "highly significant" (THOMPSON 1957; THOMPSON et al 1962) are in maturity described as having only "significant" emotionality; and those rats whose emotionality in childhood is described as "significant" (HOCKMAN 1961; ADER and BELFER 1962) are described as having "non significant" emotionality in maturity.

TABLE 29

SIGNIFICANCE OF THE EFFECTS OF PERINATAL  
MATERNAL EMOTIONAL STRESS ON THE OFFSPRING  
OF RATS AT DIFFERENT AGES.

Name of study.	Significance in Childhood.	Significance in Maturity.
Thompson (1957)	Very significant at 30-40 days	Significant at 130-140 days
Thompson, Watson, Charlesworth 1962	Very significant at 30 - 40 days	Significant at 130 - 140 days
Hockman(1961)	Significant at 30-45 days	Not significant at 180-210 days
Ader and Belfer (1962)	Significant 30-40 days	Not significant at 135 days.

The result of no association found in this study would therefore agree with the tendency in these animal and human studies that the older the child is, the less evidence there is of the influence of Perinatal Emotional Distress.

(2) The level of stress

It may well be, also, that there is no association between Perinatal Emotional Distress and attainment/achievement because of lack of severity of the stress. Those children whose mothers had been subject to severe emotional stress around pregnancy are likely to show high emotional behaviour for a longer period than those whose mothers had been subject to less emotional stress in pregnancy. In studies such as the present, using recollected emotional data, the severity of the stress need not be an absolute criterion but a relative one. For example, among the factors taken in the present is pre-marital conception. PARFITT (1952) and TETLOW (1955) have shown that this can cause such emotional stress in pregnancy that where there is no prospect of marriage it can be at times associated with mental illness in the mother. However the stress caused by pre-marital conception in an illegitimate pregnancy where there is no prospect of marriage may be somewhat more severe than when the mother has prospects of marriage. All the mothers known to be in this category in this study apparently had prospects of marriage (they all subsequently married). While pre-marital conceptions do lead to severe stress in pregnancy, the degree of stress would seem not to be absolute but relative to the situation vis-a-vis marriage the prospective mother finds herself to be in. That is the mothers in this study need not have been under as severe a stress as one would have first imagined, where this factor is concerned, and possibly the same may be true considering other factors.

## B. PARENTAL EMOTIONAL DISTURBANCE

The hypothesis that children of emotionally disturbed parents would be likely to perform poorly in reading and arithmetic was derived from such studies as those by BECK and LEMPP (1969), DE et al (1970), FREEMAN and SAVASTANO (1970), STERLE (1970) and McINTIRE and PAYNE (1971). All of these showed that in families where the parents are emotionally disturbed the children are likely to perform poorly scholastically. In no way do the results in the present study confirm these findings. No association was found between Parental Emotional Disturbance and attainment or underachievement among the children of this study either in the correlations or in the zone analysis.

Two possibilities may be tentatively advanced to explain the divergence of these results from those of other studies. These are

- (1) the effects of the coping behaviours of the children;
- and (2) non-adjustment in the children acting as an emotional outlet.

### (1) Coping behaviours.

The extravert, finding himself in a situation of stress, may react by some form of overt activity e.g. he might appear to ignore the stressful situation and indulge in attention seeking pursuits. He emphasizes what STOTT (1964) calls an "executive mechanism". The introvert may simply withdraw from the situation e.g. seek solace in an individual pursuit such as reading. Thus, if the emotional disturbance in the parent(s) is chronic, as it is in this study, the children develop coping behaviours which enable them to maintain a near optimal relationship with the stressful situation and so the effects of the stressful situation are negated.

The inadequacy of this argument, however, is that it must be equally viable for the children of previous studies.

(2) Non adjustment in the children acting as an outlet.

It has been put forward by SMITH (1943) and by LICKORISH (1964), though disputed by CUST (1958), that enuresis can function as an outlet for some children enabling them to get rid of pent up emotions and so concentrate on the task in hand. Perhaps the non-adjustment in some of these children acts in a similar way by allowing their attention to be turned from the home environment, and therefore functions in a positive way towards schooling. If this be true it may be worthy of research to differentiate between those children whose schooling is and is not affected positively by non-adjustment.

CHAPTER XX1

THE RELATIONSHIPS BETWEEN THE FIVE VARIABLES  
AND ATTAINMENT, AND BETWEEN THEM AND LEVELS  
OF READING ACHIEVEMENT AMONG THE BRAIN-INJURED  
CHILDREN.

In this study the Koppitz norms of the Bender-Gestalt test, (KOPPITZ 1964), were used to diagnose brain-injury. Thirty four boys and girls who had three or more "highly significant" brain-injury indicators on these norms comprised the Brain-injured Group. This group further differed from the other groups in that

- a) it included both sexes
- and b) its age range went from seven through twelve years.

In her summary of research findings KOPPITZ concludes that brain-injured children as a group tend to do poorly on the Bender test regardless of I.Q. scores and "may be expected to have a high incidence of learning difficulties and emotional problems". The mean Verbal I.Q. of this group - 98 (S.D. 13.25)<sup>(1)</sup> is consistent with this conclusion as is also the finding that Mean Neuroticism is 16.9<sup>(2)</sup> (twenty three of the thirty four children being one S.D. or more above the mean for their age and sex group).<sup>(3)</sup> In these respects this group therefore agrees with Koppitz's descriptions of Brain-injured children.

In the zone-analysis no significant relationship was found between the variables and levels of reading achievement. Using correlations, only Perinatal Emotional Maternal Distress was found to be significant (.05).<sup>(4)</sup>

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(1) Appendix XV111 (p.A96).

(2) Ibid, (p.A96).

(3) When matched individually against their own age/sex norms. (Chapter X.)

(4) Chapter XV1, Section D.

This correlation ( $r = + .375$ ), being positive, goes against the expectation that such distress would be associated with low attainment in reading - an expectation based on literature already discussed.<sup>(5)</sup>

One would certainly not expect Perinatal Emotional Maternal Distress to be correlated with the children's achievement. One possible explanation for this may be that there is a very high correlation between this variable and some other of the selected variables. Thus Perinatal Emotional Maternal Distress would in some way be "stealing" from the variance contributed by the other variables to the regression analyses. (This is the same explanation, though applied in the opposite direction, sought for by BARKER LUNN 1971 pp. 9-10<sup>(6)</sup>). An examination of the correlations, (Table 30) shows no significant correlations whatsoever.

TABLE 30

CORRELATIONS BETWEEN PERINATAL EMOTIONAL  
MATERNAL DISTRESS AND THE OTHER VARIABLES  
AMONG BRAIN-INJURED CHILDREN.

RDG.	P.Attit.	C.A.	I.Q.	N.	E.	D*
.375 <sup>(1)</sup>	-.068	.249	-.178	.153	-.246	.06

\* D = Parental Emotional Distress.

(1) Significant at .05 level, (two-tailed).

SOURCE: p.A96

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(5) Chapter V11

(6) Barker Lunn in an investigation of the contributions to attitude to school sought suppressor variables when she unexpectedly found that ability did not play any part in attitude to school.

Supposing however, that Perinatal Emotional Maternal Distress were to be correlated with another variable, not present in this study, what might this unknown variable be? It is possible that Perinatal Emotional Distress may be associated with physical complications in pregnancy and damage to the foetus. KLEIN et al (1950) reported that fear of foetal damage was the most important of a number of variables he studied, DAVIDS and DE VAULT (1962) found a high correlation between complications and difficulties in childbirth and high anxiety in pregnancy; and PATTERSON et al (1960) found a similar correlation between high anxiety and haemorrhage.

It may therefore be assumed that a large proportion of Perinatal Emotional Maternal Distress in this group was associated with fear of physical complications in pregnancy, i.e. there may be a high correlation between emotional and physical perinatal distress - which latter may be associated with brain injury.<sup>(7)</sup>

Is birth injury associated with reading underachievement? MALMQVIST (1960) found no relation between difficult deliveries and birth injuries and subsequent poor reading on a sample of 398 Swedish Elementary school children. BARKER and EDWARDS (1967) report that perinatal factors have a fairly strong association with gross intellectual retardation, but only minor association with educational performance. TIZARD and HEMMING (1970) report in the Isle of Wight study that overt/neurological disorder "usually perinatal in origin" was found to be associated with intellectual retardation but not with specific reading retardation. (p.123)

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(7) WHITMORE and RUTTER (1970 p.76) report however that this is not so in the Isle of Wight study.

Thus a tenuous argument may be produced - emotional distress may be associated with physical distress, physical distress is not associated with underachievement in reading; therefore there is no reason to expect emotional distress to be associated with underachievement - thus:-

Emotion  $\longrightarrow$  Physical  
Physical  $\nrightarrow$  underachievement  
therefore, Emotional  $\nrightarrow$  underachievement

- and this might go some way towards explaining why Perinatal Emotional Maternal Distress might justly be associated with good reading rather than with poor reading.<sup>(8)</sup>

However, a much more likely explanation is that this result is spurious, and can be disregarded. Dealing with a number of intercorrelations where one is significant the others not<sup>(9)</sup> we must be wary of such a significance. The F - Ratio in the analysis of variance (1.96 d.f.<sub>1</sub> = 7; d.f.<sub>2</sub> = 26) is not significant.<sup>(10)</sup> The most likely conclusion therefore is that the correlation between Perinatal Emotional Maternal Distress and reading attainment in this group of brain injured children is spurious and can be disregarded. Nevertheless it suggests that further research with this variable with brain injured children should be carried out.

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(8) This conclusion is conjecture. The argument may be logically valid but this is no proof of its truth. It merely shows this conclusion follows from these premises.

(9) Only this one out of seven possibilities is significant (Appendix XV111 p.A96)

(10) Appendix XV111 p.A97.

CHAPTER XX11

THE INDIVIDUAL CONTRIBUTIONS TO THE VARIANCE IN  
READING AND ARITHMETIC ATTAINMENT

As KERLINGER and PEDHAZUR (1973 p.8) point out, it is unwise to analyze continuous variables into high-low and the like as has been done so far both here and in a number of studies. By so doing, information is thrown away and considerable variance is lost. Relationships appear significant and non significant when in reality they need not be so. Multiple regression analyzes the total information - nothing is lost. In this study, in order to give an overall picture of the importance of each variable, each variable's contribution to the variance was calculated from a regression analysis by means of the method outlined by Ferguson - multiplying the standardized partial regression coefficients ( $\beta_s$ ) by r's. (FERGUSON 1966). Each ( $\beta \times r$ ) equals a given variable's contribution to the variance; the sum of the contributions equals  $R^2$ . Appendix XX (p.A109ff) gives a full list of these contributions.

When comparing the variance accounted for<sup>(1)</sup> when using I.Q. and C.A. as predictors for the older and younger children with that accounted for by using all the variables as predictors for the four groups, it can be seen (Table 31) that an improvement in prediction has been made. This, of course, is only to be expected - the more variables, the greater the predictive validity.

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(1) The sample, are, however, not quite the same.

TABLE 31

THE VARIANCE (%) ACCOUNTED FOR USING TWO SETS  
OF PREDICTORS

		A	B
<u>RDG.</u>	YB	22	36
	YG		60
	OB	49	54
	OG		58
<u>ARITH.</u>	YB	39	49
	YG		61
	OB	24	40
	OG		47

A = C.A. and I.Q. as predictors for groups of older and younger children.

B = all variables as predictors for the four groups of YB, OB, YG, OG.

It had been hypothesized that I.Q. and C.A. would consistently make the largest contribution to attainment; that Parental Attitude, Neuroticism and Extraversion would form a group of variables which would make the next largest contribution; and that Perinatal Emotional Maternal Distress, and Parental Emotional Disturbance would make the least contribution to attainment.

Examining the contribution of all the variables in this study

TABLE 32

CONTRIBUTIONS TO, AND UNACCOUNTED FOR,  
VARIANCE BY GROUP/SUBJECT(%)

GROUP/ SUBJECT	R <sup>2</sup>	P.Att.	C.A.	I.Q.	N.	E.	M.*	D.**	U***
YB Rdg.	.39	5.4	0.8	18.4	6.5	2.9	5.3	0.1	61
Arith	.50	6.3	16.8	19.9	-0.3	2.0	2.6	2.5	50
OB Rdg.	.61	0.0	4.4	44.7	0.2	9.9	1.6	0.6	39
Arith	.39	6.4	0.0	24.8	7.8	-0.01	-0.01	0.2	61
YG Rdg.	.60	2.2	30.8	5.3	12.3	0.8	5.5	3.1	40
Arith	.63	1.9	16.2	31.2	-1.2	12.4	7.0	-4.4	37
OG Rdg.	.59	0.7	8.3	48.2	-0.06	-1.5	2.6	0.01	41
Arith	.47	2.5	15.1	24.3	-0.06	1.5	3.8	0.001	53
B.I. Rdg.	.35	6.1	6.9	6.6	-0.1	-0.2	14.4	0.7	65

\* M = Perinatal Emotional Maternal Distress.

\*\* D = Parental Emotional Disturbance.

\*\*\* U = Unaccounted variance.

it can be seen from Table 32 that I.Q. is the principal predictor of both reading and arithmetic attainment among all groups excepting YG reading and the Brain-injured Group. It contributes over 40% to the variance in two groups, OB reading (44.7%) and OG reading (48.2%); and between 18.4% and 31.2% in all other groups except YG reading and the Brain-injured Group. Since in this latter group the F-Ratio is not significant (Appendix XVd11 p. A96) it will not be discussed. In YG reading, I.Q. contributes only 5.3% to the variance. This small contribution appears to be a function of this particular

group of YG. From Appendix XV111 (p.A84) it can be seen that the correlation of I.Q. with reading attainment among YG is not significant ( $r = .098$ ); that the correlation of C.A. with reading attainment is significant at the .01 level; and that I.Q. and C.A. are negatively correlated (though some significance is reached - .05 two-tailed). This suggests that in this group of YG the older ones are less bright and the younger ones are more bright.

Generally, therefore, I.Q. contributes, at the least, commensurately with the 25% reported by CATTELL (1965 p.166) by BUTCHER (1968 p.290) and by JENSEN (1973 p.92). As of old I.Q. is paramount in the prediction of attainment, followed by C.A. which, with the exception of O.B. arith., is consistently the next best predictor (being the best among YG reading).

The consistency throughout the groups with which a variable predicts attainment, however, stops here. One might expect to find a large, and hopefully consistent contribution from some of the remaining variables, particularly from Parental Attitude, Neuroticism, and Extraversion, all of which have strong support for this in the literature. However, no clear pattern emerges - not one shows any consistent predictive power. Neuroticism accounts for a goodly 12.3% among YG reading, and Extraversion for 12.4% among YG arithmetic. Apart from this, these same variables in the remaining groups and the other variables show large variations in their contributions per subject and none contribute more than 9.9% (Extraversion OB reading).

#### Suppressor variables

Some variables contribute a minus quantity to the variance in certain groups. These are listed in Table 33.

TABLE 33

SUSPECTED SUPPRESSOR VARIABLES AND THEIR  
CONTRIBUTION TO THE VARIANCE

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YB arithmetic	N	-0.3			
OB arithmetic			E	-0.01	M* -0.01
YG arithmetic	N	-1.2			D** -4.4
OG arithmetic	N	-0.06			
OG reading	N	-0.06	E	-1.5	

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\* M = Perinatal Emotional Maternal Distress

\*\* D = Parental Emotional Disturbance.

Since WIGGINS (1973), nor McNEMAR (1962), nor GARRETT (1966), who have brief discussions about suppressor variables, do not specifically say that suppressor variables can be identified in this way, such variables were examined (Appendix XX111 p.A 117f) to discover whether or not they fulfilled the criterion for suppressors - low validity with the criterion variable but higher validity with the other predictors.

It can be seen from this appendix that the suspected suppressor variables of Table 33, Neuroticism, Extraversion, Perinatal Emotional Maternal Distress, and Parental Emotional Disturbance appear to function in certain groups in such a way that they do have low validity with the criterion and high validity with the other predictors. To this extent they may be termed suppressors. McNEMAR (1962) writes that when a suppressor is combined with another

independent variable "an appreciable gain in prediction occurs even though when taken along the suppressor is worthless as a predictor". This gain does not appear here to be large. As can be seen from Table 33 it ranges from 4.4% for Parental Emotional Disturbance among YG arithmetic to 0.01% for both Extraversion and Perinatal Emotional Maternal Distress among OB arithmetic.

Other than I.Q. and C.A. therefore, the five variables which have been studied at length here, appear not to have much predictive power when reading and arithmetic are the criterion variables. This finding underscores the lack of association which frequently occurred when less powerful statistical techniques were used earlier.

#### Some wider implications

Perhaps the most surprising result is that both Neuroticism, and Extraversion are unexpectedly poor predictors of attainment in these children. This may be seen as a reflection of the opinion of a number of educational psychologists known to the writer<sup>(2)</sup> who see a low relationship between their personal judgements of children's personality and that of the J.E.P.I. This questioning of validity may be seen also in the low relationship between teachers' ratings of personality and the J.E.P.I.'s ratings reported by EYSENCK and PICKUP (1968) and by EYSENCK and COOKSON (1969).

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(2) This opinion has been made known to the writer by the following among others:

G. Quinn - psychologist - Glasgow Child Guidance Service;

F. Mason - " " " "

I. Duncan - " " " "

H. Morrow - " - Notre Dame Child Guidance Clinic, Glasgow.

Dr. Small psychiatrist - Dept. of Child and Family Psychiatry, Glasgow

Dr. Hamill " - Fern Tower Adolescent Unit Glasgow.

Neuroticism has here been treated as having a linear not a curvilinear relationship with attainment. If in fact there is a curvilinear relationship this would go some way towards explaining the very low associations actually found (however such curvilinearity does not appear in the zone analysis, where Eysenck had suggested it might appear).

Since therefore the linear regression treatments show in most cases such low predictive ability, this strongly suggests that the J.E.P.I. (comprising Extraversion as a whole)<sup>(2)</sup> is not as efficient a predictive instrument with this type of child as it has been reported to be with the population at large.

It was suggested in an earlier part of this discussion that using the syndromes of Accepting and Rejecting attitudes was perhaps too gross a technique. Certainly using coded variables in the regression has revealed very little predictive power. However it would be possible by using a system of dummy variables to make use of a much finer and perhaps more meaningful treatment with respect to Parental Attitude and certain other variables. Appendix XXIV (pp.A 119-A122) gives outline for the use of dummy variables which might go some way towards a finer analysis.

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(2) As far as relationship to attainment is concerned the lack of the predictive ability of Extraversion reported here is further strengthened by what GIBSON (1974) terms "the two faces of Extraversion" - "sociability" and "impulsivity" which EYSENCK and EYSENCK (1963) had reported were secondary loadings on Extraversion. BENNETT (1973) has tried to show that these two have a different influence on attainment - he reported that average impulsivity was related to attainment in ten to twelve year olds, whereas low and high impulsivity was not; and that high sociability tended towards high attainment, and low sociability towards low attainment. The level of Extraversion in this study is somewhat lower than that of the normal population, (Appendix X p.A44) a subdivision into impulsivity and sociability may reveal quite a different picture and so confound the influence of Extraversion taken as a whole.

PART SIX

CHAPTER XX111

CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

This chapter is presented in three parts.

- A. A statement of the main findings.
- B. Conclusions from each of the main findings.
- C. Some broader inferences which may be made from the findings.

A. Statement of the main findings.

The following are the main findings of this study.

1. Parental Acceptance is positively correlated with attainment in reading among YB (.025); and with attainment in arithmetic among YB (.05).

\* Parental Acceptance is associated with achievement and Rejection with underachievement in reading among YB (.02), and among YG (.01)  
↓ ?

2. High neuroticism is (unexpectedly) positively correlated with good attainment in reading among YB (.05, two-tailed).

Stability is associated with achievement in arithmetic in a reduced sample of OB (.05). Neuroticism is (unexpectedly) associated with achievement in reading among YB (.01, two-tailed) and among a reduced sample of YG (.02, two-tailed).

3. Introversion is (unexpectedly) correlated with reading attainment among OB (.02, two-tailed).

Introversion is (unexpectedly) associated with achievement in reading among OB (.02, two-tailed).

4. No significant relationships were found between Perinatal Emotional Distress and reading or arithmetic.
5. No significant relationships were found between Parental Emotional Disturbance and reading or arithmetic.
6. Among the brain-injured children Perinatal Emotional Maternal Distress is (unexpectedly) correlated with good attainment (.05, two tailed). No further significant relationships were found in this group either in the correlations or in the zone analyses.
7. Verbal I.Q. and C.A. consistently make the largest contributions to the variance in attainment in both reading and arithmetic in each of the four main groups. The remaining variables make unequal contributions to the variance in each group. Parental Attitude, Neuroticism, and Extraversion, as a group, do not make the expected contribution to the variance.
8. Among the Brain-injured Group, while Perinatal Emotional Maternal Distress makes (unexpectedly) by far the largest contribution to the variance in reading attainment, the regression analysis does not reach significance.

B. Conclusions from each of the main findings

The population of this study, comprising only children attending a child-guidance clinic, is such that it militates against many of the findings being generalized to other than a clinic sample.

1. Parental Acceptance is positively correlated with reading attainment among YB (.025) and with arithmetic attainment among YB (.05). Parental Acceptance is also associated with achievement and Rejection with under-achievement in reading among YB (.02) and among YG (.01).

The significant findings here are in agreement with the bulk of the literature. However there are so many non-significances that a number of questions are raised.

(a) The perception of Parental Attitude by different perceivers - the parents themselves, judges outwith the family, and the children themselves - may lead to different categorizations of Parental Attitude. Differences of perception between children and judges were shown in a sample of thirteen children. On this very small sample and based only on one question, no firm conclusion can be drawn. However it is of interest to note that the group in which the result of an association between Parental Attitude and attainment is in accord with the literature - the Younger Boys - is that group in which there is the lowest discrepancy between the judgements of the social workers and the perceptions of the children themselves. The comparison of different perceptions of attitudes related to attainment and to levels of achievement, not only in clinic populations but generally, appears worthy of further study.

(b) The criteria for the 'syndromes' of Acceptance and Rejection as defined here appear to be too gross. Need for achievement may be common to both. Parental pressure or lack of such pressure is known to affect achievement and underachievement. A better categorization than Acceptance and Rejection is needed which will partial out any factor or factors, such as need for achievement, which may be common to both Accepting and Rejecting attitudes and which may lead away from the expected tendency of acceptance leading to achievement and vice versa; at the same time, however, such a categorization, it is felt, should not lose the global approach used here which allows for weight being given to such subtle nuances as a rating scale might miss.

2. High neuroticism is (unexpectedly) positively correlated with good attainment in reading among YB (.05 two-tailed). Stability is associated with achievement in arithmetic in a reduced sample of OB (.05). Neuroticism is (unexpectedly) associated with achievement in reading among YB (.01, two-tailed), and among a reduced sample of YG (.02, two-tailed).

The circumstances under which the tests were given in this study may well have been such that no anxiety was provoked in the children. Insofar as this is the case the general result of very few significant relationships strengthens the suggestion by WRIGHTSMAN (1962), and CARON (1963), and SAVAGE (1966), that there may be unusual results.

The result that high neuroticism is associated with reading achievement among (YB) (and tends to be so among YG) may be a function of the sample. However it suggests that WARBURTON'S summary that anxiety is never an advantage to the under fifteens is too blanketing. The result suggests that high neuroticism may be of advantage to the under-nines in this sample, particularly the boys. Such is the paucity of studies of under-nines in this area that further studies are necessary in this age-group in the general population.

The possibility that it is not the reading task itself which defines the complexity of the task, but gradual build up of further frustrations within the individual, as noted by other workers, is discussed in relation to the above result. This appears to have implications not only for a clinic sample but for the school population at large. It suggests that the training for remedial teachers should be biassed in some measure towards a therapeutic pedagogy where the lessening of frustrations in the child is seen as a prophylactic.

3. Introversion is (unexpectedly) correlated with reading attainment among OB (.01 two-tailed). Introversion is (unexpectedly) associated with achievement in reading among OB (.02, two-tailed).

It was found that introversion is significantly associated with achievement in reading among the Older Boys. This supports a minority of papers dealing with this age group and also appears to support the Eysenckian approach that extraversion is detrimental to achievement.

However this finding need not fully support Eysenckian theory. It may be a function of what happens to these children in the classroom, as WILSON (1972) proposes. It is suggested here that the large number of non-significant but positive correlations between Extraversion and attainment may be explained in terms of at least a countervalance between

a) Eysenck's theory that extraverted children would quickly lose interest and so tend to underachieve,

and b) the possibility that these children are in fact helped by the interaction with the teacher; which interaction helps to guide and keep the extravert's nose to the grindstone.

This interaction between teacher and extraverted child appears to be as viable an interpretation of this result (of non-significant but positive correlations) here, and in other empirical studies, than is Eysenck's theory per se based on unknown cortical processes. Further, older introverts within the same classroom atmosphere are left to get on with the work and in so doing make use of the quality of persistence epitomised in a "paper and me" rather than a "face to face" situation. This allows them plenty of practice and so steers them towards the achievement reported here among OB.

4 and 5. No significant relationships were found between either Perinatal Emotional Maternal Distress or Parental Emotional Disturbance and reading or arithmetic.

Both these areas are seen as very tenuous, where selectivity can easily occur not simply on the part of the parent, but also both on the part of the workers involved and the researcher.

No association was found between Perinatal Emotional Maternal Distress and attainment or levels of achievement. It is suggested that the older the child is, the less likely it is that he will be affected. Further, the severity of the stress, though apparently severe in the absolute sense need not be so when the particular situations of these mothers are taken into account. Hence any effects which may have emanated from such stress if they existed at all may not have lasted the length of time necessary to record an effect on the children of this study. There is the possibility however that ~~though~~ the effects of the stress itself on the child have worn off say by seven years as would appear to be the case here, if they had lasted into the infants' classes they may ~~have helped~~ to start off the frustrations in the child, already mentioned, which could lead to underachievement.

No association was found between emotional disturbance in the parents and attainment or level of achievement. Coping behaviours of the extravert and introvert, and the concept of "non adjustment" as an emotional outlet, are considered as possible explanations for the divergence of this finding from the empirically based hypothesis. The former suggestion about coping behaviours, does not differentiate between the children in this study and children in previous studies. However the latter suggestion does raise the interesting speculation that the schooling of some of these children may benefit in some way by their not being well adjusted.

Longitudinal studies centring upon age and severity effects may add light to the effects of both these variables.

6. Among the brain-injured children Perinatal Emotional Maternal Distress is (unexpectedly) correlated with good attainment in reading (.05, two-tailed). No further significant relationships were found in this group.

Among the brain-injured children only Perinatal Emotional Maternal Distress shows any significant association with attainment - this is not in the expected direction - rather it is that such distress is correlated (.05, two-tailed) positively with reading. A somewhat conjectural argument is proposed to support this finding as it stands - that such distress might be associated with physical pregnancy distress; this latter while associated with intellectual retardation does not appear to be associated with reading underachievement in the literature, and so the hypothesis of an association between Perinatal Emotional Maternal Distress and reading underachievement among these children may be ill-founded.

7. Verbal I.Q. and C.A. consistently make the largest contributions to the variance in attainment in both reading and arithmetic in each of the four main groups. The remaining variables make unequal contributions to the variance in each group. Parental Attitude, Neuroticism, and Extraversion, as a group, do not make the expected contributions to the variance.

Using a multivariate regression analysis to partial out the individual contribution of each variable including Verbal I.Q. and C.A. to the variance in each of the four main groups in both reading and arithmetic, it was found that only Verbal I.Q. and C.A. contribute largely and consistently. In most cases Verbal I.Q. contributes about or more than the 25% reported in other studies. This suggests that in this sample of a clinic population I.Q. is paramount. Apart from C.A. the contributions of the other variables in this study follow

no general pattern and in the main contribute little or negligible amounts or, especially in the case of Neuroticism, they appear to function as suppressor variables.

The possibility that the coded variables - particularly Parental Attitude - were too gross has been suggested earlier. It will be remember that the original data collected from the questionnaire "Patterns of Parental Behaviour" comprised seven categories. If, for example, this type of data were divided into say four rather than two, as here, categories, a much finer and perhaps more revealing design might result. Suggestions for a use of dummy variables are demonstrated with various data in Appendix XXIV (pp. A119-122) which draws upon the work of JOHNSTON (1972) and KERLINGER and PEDHAZUR (1973).

8. Among the Brain-injured Group Perinatal Emotional Maternal Distress makes (unexpectedly) the largest contribution to the variance in reading attainment.

No adequate explanation is put forward for this finding. However, the F - Ratio in the analysis of variance is not significant. This suggests that there is insufficient evidence to spot light any genuine regression, and further suggests that a study concentrating upon this variable in these children is necessary before any conclusion can be reached.

The overall finding in this study of primary school children attending a clinic for emotionally stressed children is that the personality and social factors studied - Neuroticism and Extraversion in the children, parents' attitudes of Acceptance and Rejection,

Perinatal Emotional Maternal Distress, and Parental Emotional Disturbance - appear to have much less relationship with reading and arithmetic performance among these children than has been reported among children in the normal population. Where they do however have their strongest relationship, (particularly in the case of Neuroticism and Extraversion), this relationship with these children's performance is quite different from the relationship they have with the general population's performance. To that extent, the findings here lead to a conclusion similar to that reached by KLINE and GALE (1971), that to state as a general finding that success in school is related to personality variables would be unwise since it appears from the present study that the direction of the relationship is not agreed upon for particular groups of children. The conclusions also re-emphasize the importance of Verbal I.Q. as a factor predisposing to attainment.

C. Broader inferences which may be drawn from the results.

The above conclusion does not mean that inferences cannot be drawn from these results; rather it means that when they are drawn caution must be exercised. From even a prima facie examination of these results it can be seen that both the attitude of the parents, and the personality of the children have a complex interrelationship with the performance level of these children. What, if any, are the broader inferences which can be drawn from these results and which may be relevant not only to these children but to schools in general?

Broader inferences can be drawn tentatively which relate to the discussions on Parental Attitudes, Neuroticism and Extraversion.

It was suggested in the discussion about Neuroticism that certain children may build up frustrations towards learning from an early age and that this emotionality may at times be attributed to the school situation. It has also been suggested in the discussion about parental attitudes that the child may realize in the school an affiliative need unfulfilled at home. How can the school both prevent such a build-up and fulfil this need? This may be done by providing what can be termed a therapeutic atmosphere within the classroom, or if the child's needs are too great, within a remedial situation in the school. In a word, although the children in this study were attending a child guidance clinic for educational and emotional therapy, the writer does not feel that it begs the question to advocate that all schools should provide some forms of therapeutic measures since these measures in effect provide substitutes for those experiences which the accepting home provides for a child's all-round growth. This is not to suggest the school becomes a para-child-guidance clinic.

The therapeutic atmosphere in a classroom would be derived from three main principles:-

(1) Love and security. These would be arrived at not necessarily by the unconditional acceptance of the child suggested by psychotherapists when talking about the therapy situation per se. Such an acceptance would be impracticable. For classroom use, teachers could achieve this in terms of a modification of the teacher's and the child's behaviour as described by DOLLAR (1972) and by NEISWORTH and SMITH (1973), and others, exemplifying the extension of operant conditioning techniques into the classroom situation. Here the emphasis is on reward, not punishment. By accepting some behaviours and ignoring others, a situation can be built up in which a previously rejected child, rejected at home and perhaps rejected in class for acting out or withdrawn behaviour, can the more easily identify with the teacher.

(2) Mastery of new experiences. The operative word here is mastery. Without new experiences the child cannot learn, the teacher therefore must provide experiences within the child's capabilities. By mastering something, however small, the child builds within himself a sense of achievement and so the build-up of frustrations is prevented - at least for the moment.

(3) New experiences must be mastered continually and this leads to the third principle - the sense of achievement. Achieving at one level provides a strong incentive to persevere at the next. The child finds pleasure in success and in the deserved praise given by the teacher with whom, perhaps, he now identifies.

There is nothing very radical or even novel in this proposal<sup>(1)</sup> but it may be taken further. At present it is rare that children in infants' classes are given remedial (therapeutic) treatment individually or in classes. The result in this study suggests, however, that this should be changed and the principles of therapeutic education be extended to these children. If it be true that certain children identify with the teacher, in place of the parent; and if it be true that emotionality can build up within the child to make what is essentially a simple learning process complex (as might be the case in the present study), then as soon as such conditions are identified the child - infant or junior - should be put into a remedial situation for part of the school day. Here the three principles of the therapeutic environment - love and security, mastery and recognition and achievement - can be enhanced, and the child, returning to the normal class, carries this feeling of self enhancement within him, the more so if the classroom teacher is made more aware of a therapeutic role.

So much for within the classroom situation. Suppose a child is good at music but little else, and this talent is not appreciated at home; the child's emotional and achievement drive may be blocked at home. The school however recognizing the child's talent promotes it, thus providing for the child's affiliatory and/or, achievement need(s). How can the school affect the parents' regard for the child? The current Local Government (Scotland) Act has reduced the present thirty five education authorities to eight regional

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(1) A good account of it is given by HEWETT (1964) in his "Hierarchy of Educational Tasks for Children with Learning Disorders". This paper however describes work at the Neuropsychiatric Institute School, Los Angeles. The point here is that these approaches should be part and parcel of the everyday teacher's armoury. Prevention of a disability, where possible, is better than its cure. JENSEN (1973 p.112ff) does not appear to take any account of this therapeutic approach in his overview of intervention programmes, for disadvantaged. The writer feels this weakens Jensen's case. The BULLOCK REPORT (1975) also, makes only passing reference to the importance of this approach, devoting part of one paragraph (18.12 p.271) to it.

and three island authorities. While this in itself will bring about major changes in the administration of education, inter alia it should involve not only these elected but also those who elected them, in that the structure should provide "channels of two-way communication between local authorities and the public" (WHEATLEY REPORT 1969). In a short discussion about the institution of schools councils outlined in the Wheatley Report McKECHIN (1973) questions whether these councils will achieve local involvement and says "The involvement in schools that the public really desires is fundamentally a personal involvement, viz, the involvement of parents in their children's education, not to decide at some remove, through a third party (the school council), some of the trivia of the school's administration" (p.64).<sup>(2)</sup>

In effect what McKechin is suggesting is the growth of parent - teacher associations. Because of the reorganisation of local government this may be the optimum time to promote such a growth. However these associations need not be, in the writer's opinion, the formalised associations which may develop into parent versus teacher, or in which only the 'good parent' gets involved. Rather they may be more of a "regular social evening" association where, at times, the children themselves are present. There is a "social evening continuum" which may be said to range from the lecture situation through cheese and wine to bingo. To attract the "problem" type of parent some schools must be prepared to use the latter end of this continuum regularly. It is at informal functions such as these that the school through personal interaction between teacher and parent can perhaps influence our parent above by, as it were, opening the parent's eyes to the talent of his child.

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(2) That McKechin is correct on this point can clearly be seen in the interest taken in current discussions on schools councils in which much is centred upon the parents' personal involvement.

The finding here that among the Older Boys introverts were better achievers than extraverts led to some discussion concerning the different types of interaction and coping behaviour of the two personality groups. A wider question may, however, be raised. The last decade has seen great changes both in what has been going on within the classroom, and within school organization in general. Do we have the type of school organization in which all children, regardless of their personality group, can blossom? Both WILSON (1972) and NAYLOR (1972) have summarised the speculated reasons for the general tendency that, while at primary school level extraverts are the better achievers, introverts are the better achievers at the tertiary level.<sup>(4)</sup> Could it be that particular types of system if not well organized, help the extravert at the introvert's expense?<sup>(5)</sup>

Bullock (pp. 202-203) stresses that the value of classroom organization techniques "ought to depend on an assessment of the needs of the individual children, not on the way the children are arranged into individual classes". Do particular types of school or classroom organization inadvertently help one personality group at the expense of an other, and in so doing depress potential? These questions can only be answered by further research?

It has been argued here that the introvert and the extravert appear to react differently to different classroom situations. The present, but not widespread "integrated day" system (Appendix XXV pp.A 123-128) appears to offer a balance whereby both the introvert and the extravert might use their

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(4) See Chapter V, pp. 40-41.

(5) Of open plan schools, for example, MARKER (1974) writes: "There has been a rapid expansion of the number of primary schools with 'open' features, but little systematic investigation of the problems of organising them" (p.33).

different reaction behaviours within the classroom to best advantage.<sup>(6)</sup> This system, however, has two major drawbacks.

- (1) It makes very great demands upon the teacher; its effectiveness may be said to rely in large part upon her commitment to it, perhaps more so than in other systems.
- (2) "The circumstances in which it may be of very limited value - indeed, where it may be of much less value than a traditional teacher - directed programme - are primarily those in which for one reason or another the children are particularly insecure". (TAYLOR 1971 p.54)

The writer fears, therefore, that if the "integrated day" is not well run (a) because of ineffectual teaching, the introverts may still lose out to the extraverts due to the latter's propensity for gaining too great a share of teacher's attention; and b) because of lack of direction, the more insecure child will find himself all at sea.

There does appear, however, to be a single improvement which would go a long way to counteract both these fears. It would be of advantage to both teachers and children to formalize the "integrated day" by drawing upon the approach of the "old" Winnetka Plan.<sup>(7)</sup>

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(6) TAYLOR (1971 p.53) writes "The aims of an Integrated Day are material to its structure... We are not here concerned with broad philosophical aims, but with the practical objectives of good class organisation which have already been summarised: the happiness and well-being of every child and his progress according to his capacity; the encouragement of initiative and self reliance in an atmosphere of controlled freedom; and the individual approach in teaching that good modern practice requires. The supporters of the Integrated Day believe that these objectives are more readily attained if both children and teacher are free to follow a less centrally directed programme, or, more accurately, a programme in which central direction is less evident."

(7) For an account of the Winnetka Plan see HUGHES and HUGHES 1946 pp. 388-390

More particularly, the individually graded 3R<sup>s</sup> section of the Winnetka Plan, whereby the child does not progress to the next section until complete success has been gained, on the one hand, appears to approximate a balance for both the introvert and the extravert, and on the other hand introduces more direction for the insecure child (and for the teacher). Thus, the introvert can use his "paper and me" approach to the full, and the extravert can be held in check by the necessity to complete the section. Again, the insecure anxious child would gain by knowing exactly what, and to what criterion of success, he has to attain. The second section of this system, the "activity" section, to be advantageous to the anxious child would require to be much more closely controlled for him, but it would allow the extravert scope for interacting with the teacher, and the introvert to deploy his persistence at an activity of his own choice.

Thus this more formalized approach to the "integrated day" may be of advantage to different personality groups - it keeps the formal aspects which, it has been argued here, the introvert (and the insecure) appears to favour, but equally, provides interaction situations which the extravert appears to favour.

There appears to be a thread running through these three areas of Parental Attitude, Neuroticism, and Extraversion. This thread might well be termed "Needs - Met and Unmet", and this has implications for teacher education.

It is a generality that teachers in training have been made aware of the needs of the child. However from many conversations with both the young and the more experienced teachers attending in-service courses who have been drawn from many parts of Scotland, and from experience as a teacher within a College of Education, it appears that all too often the subject of the emotional development of the child has been introduced in

such a way that the theme of psychological needs has been kept, in the teacher's mind, within the "pigeon-hole" of the psychology lecture. Contrast this with the approach to the teaching of Piaget. The Piagetian cognition sequence is spoken of frequently in many pre-service College departments other than Psychology, notably perhaps Education, Mathematics, and Primary Education. Students are left in no doubt about the importance of Piaget.

With emotional needs however, too often the unmet needs are not stressed,<sup>(8)</sup> or stressed only within the context of the psychological and remedial support services. This means that pre-service teachers are left with the idea that "normal" teachers teach only "normal" children; other children are left aside as it were, or sent, perhaps after the damage is too far gone, to a remedial class. Often enough, for example, the Infant's Mistress takes a child into a remedial situation but this situation is geared to scholastic ability, not to meeting the child's unmet emotional needs, and therefore not approximating the therapeutic situation.

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(8) Two recent books "Teaching Practice: Problems and Perspectives" STONES and MORRISS (1972), and "What is School For?" CHANAN and GILCHRIST (1974), may be taken to illustrate this. Both mention the importance of individual emotional development but neither emphasize it to any great degree. Nor does Bullock, who, in twenty seven pages devoted to teacher training appears only to have the following line to say (in the second of two examples outlining a basic language course): "Special individual problems in language and reading; an awareness of the various influencing factors." (p.346). (See also Chapter XV11 (2) p.180).

Colleges of Education may go some way to counteract this by giving pre-service teachers the image of teaching both "normal" and "non-normal" children. This would give the teacher both the outlook and the ability to be much more aware of the necessity and the "know-how" to "fill-in" the needs missing in the home, to prevent emotional build-up, and to allow for the different behavioural modes which appear to be characteristic of different personality types. This could be done by emphasizing the interrelationships between each stage of the child's emotional sequence of development; by emphasizing, as Piaget is emphasized, throughout different departments that if any part of that sequence is unmet, it may affect not only the next step in the emotional sequence, but also perhaps the child's scholastic performance.

Such are the broader inferences which have been drawn from this research. It is advocated that there should be a more therapeutic environment within the school; that there should be greater informal interaction between the school and the parent; that the part a particular school system may play in affecting advantageously one personality group at the expense of another needs greater research, as does also the possibility that one or more school systems may be advantageous to all personality groups; and that in teacher training, pre-service teachers should be made more fully aware of the interacting effects of the child's emotional developmental sequence and school performance.

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A P P E N D I X ISUMMARY OF A FAMILY CASE HISTORYAT THE TIME OF THE INITIAL CASE CONFERENCE

The following is a modified copy of the notes made by each member of the four disciplines - the social worker, the psychologist, the play therapist and the psychiatrist. These notes as well as the report from the school to the clinic formed the basis of discussion at the initial case conference of an eight year old boy. They are inserted here the better to illustrate the multidisciplinary approach in the clinic and the sources available to the writer, To preserve anonymity, certain minor changes have been made.

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1. SUMMARY OF SOCIAL WORKER'S REPORTSOCIAL HISTORY

Mark Richards: 8yrs 6mths d.o.b. 18.6.62

Address: Glasgow W.3.

Referred by: Head teacher, primary school.

Family Doctor: Dr. J. Smith, W.3

PATIENT'S HISTORY

Paternal Grandfather: died 1950, aged 70years,  
from kidney trouble and  
old age.

Paternal Grandmother: died two years ago from  
heart failure aged 82years -  
fairly active till sudden  
death.

Father: said to be physically healthy.

Mother: Pleurisy patient for 7 months in 1956; received check ups for a number of years; these no longer needed.

Schools Last report card noted "He lied and cheated and started fights". Father said that when they first took patient to be enrolled at school just before fifth birthday, Head had said facetiously in front of him "I think you are trying to get rid of him".

Informants: (1) First referral letter from G.P dated  
(2) School report from head teacher(q.v)  
(3) Father at clinic: he related patient's problems clearly, and gave the impression of having done most of the mothering of the pt.(patient). Said that pt, played more and got on better with M.(mother) than with him. Appeared an anxious little man, lacking in confidence, but willing to co-operate in anything that will help pt. Showed good warmth for the boy but insecure of his role of handling him.  
(4) Mother at clinic: was very nervous during an evening interview, but later relaxed. Impressed as taking more of the father role with pt. Also showed good warmth and affection for the boy and although worried about his problem was a little more realistic and less tied up with anxiety than father. She did however, impress as being possibly depressed, and spoke of her grief about a younger brother who was killed in a car accident recently.

Problem: Disturbance at home and at school, also theft of money in the home. At first denied then admitted stealing. F.(father) told him he would keep a check of his money then and pt. never stole from him again. The second time took £3.10/- from mother's

handbag - admitted doing so right away - spent on his friends. Parents did not spank; F took him to police station where a sergcant gave him a friendly talking to. According to F. pt. enjoyed this except for looking at clock in case he would miss a favourite T.V. programme. Two weeks later took £2.18/- from M's bag, bought rulers at 2/- and sold them to boys for 3d, gave another friend 7/6d. Head teacher recovered £1.6/- at school, also some rulers. Again parents did not spank him but took him to head teacher, who warned pt. of Remand Homes, and approved schools, then suggested to parents they seek help of GP or clinic.

Father thinks that pt. does not feel pain as he shows no reaction to it, nor to other forms of punishment. According to parents, pt. is disobedient, always disagreeable, objecting to every suggestion, such as when told a favourite meal is coming will say "Oh, that", or, if at parties with other children will disagree over all suggestions about games. He does not want to be shown anything and resents guidance. He showed temper from a baby, (face never turns blue), does not stamp his feet, but will face up to parents; recently hit back at m., who claims he is a big boy for his age, and she cannot cope when he does this. Pt. was given toy for Christmas which was later taken from him as punishment as pt. was very attached to it; he claimed this was why he had stolen the money. It was suggested to father at first interview, that pt. now be given back his toy; this was done and so on second interview M said that pt. was pleased at first, then two days later gave it back to them saying he did not like it now and would prefer another kind of toy.

About four-five months ago pt. said to teacher that he had wakened up during the night and thought someone was touching his elbow, teacher had replied this was someone turning in his grave. Since then pt. has been afraid to sleep without the lights on. F. used to strap with a leather belt but recently has been using a plastic strap which he said had drawn blood. It was suggested he now throw this away.

Siblings: None.

Home & Conditions: Owner - occupied room and kitchen tenement flat. All sleep in same bedroom with pt. in a single bed. There is a playing field nearby and patient loves to be out playing. He has not been allowed out much recently as he does not come home at time stated.

Personality of pt. If he wants to can be very lovable, and if not stubborn, is completely contrary and not interested in anything. Was never demonstrative in affection before but recently has said to M "Give me a kiss". M. feels that she herself is not demonstrative with affection, and this could be why pt. wasn't. He likes playing with younger children where he can be the boss, was in the Cubs for a short period but didn't stay, because he was not interested. He talked recently of joining the Scouts; M feels this is useless until new season next year, and has explained he would be better joining from the start. He has shown not to be interested in group activity. Likes TV - "Scooby Doo" and "Skippy" being favourites. Is restless in the home, sometimes likes reading and if interested will do so for about twenty minutes to half-an-hour, and then moves on to something else.

Personal History:

During the pregnancy the parents had a single-end (1) in Calton. It was a good pregnancy. Labour was in hospital, forceps full-time. The parents had moved into a room and kitchen in - Street by the time pt. was born. Pt was a good baby and never kept them up at night. Solids from 10-11 weeks. Was a good eater and still is, loves fruit. A good sleeper until recently when he started waking up an odd time frightened. Toilet training from about sixteen months: did not take to this at first and GP suggested that M persevere for two weeks just concentrating on getting him to use the pot - this worked and pt has been dry day and night since. First tooth about ten-eleven months, and then not another until about fourteen or fifteen months. Talking and walking - M couldn't remember but thinks about normal, was slow at walking as he was too dumpy and fell a lot.

Illnesses: Account of usual childhood illnesses.

FAMILY HISTORY

Father: Aged 46years. Clerical officer. Youngest of family of six children with whom he gets on well. Is very interested in pt. and takes him for swimming lessons etc. As M is working from 7.30a.m. till 3p.m. each day F gives pt breakfast, puts him out to and collects from school each day, also provides lunch. Can do this because his hours are generally night-shift.

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(1) a one roomed house.

Mother: aged 39 years, is second oldest in family of four, one younger brother being killed in accident last year. Gets on well with her siblings, and is happy in her marriage; the only time she and F did not get on well was last year after her brother was killed, when she was not herself and still shows signs of depression. She works on milk lorry delivering and in charge of collections.

11

SUMMARY OF PSYCHOLOGIST'S REPORT

Remarks: (1) Attitude and appearance:- Initially Mark was unhappy and would not come for testing. His mother persuaded him gently but she finally had to come upstairs with him. When he got to my room he was quite happy and mother left. He brightened up and enjoyed the testing, asking for harder questions. He is well built with a large head and shocking brown hair, neatly dressed, clean nails which are bitten, teeth none too clean and showing spots. After the test he played happily in the sand tray, although at the beginning he was too anxious to put any material in the tray.

(2) I.Q. Mark is of average intelligence with no intellectual defects noticed here. He showed a low spread on the Binet, and I think with higher motivation his I.Q. of 95 could have been increased by a few points.

(3) Raven's Controlled Projection: The story was about a naughty boy who made his parents cross. There were indications that Mark is guilty and anxious about his behaviour and his relationship with mother and father. In the story M and F go away from the boy, only for a night however. A policeman appears, as an authority figure to punish bad boys. He talked

a lot about going to jail for a year, although he said this is only a dream. The boy ran away to a den, and stayed all night; he also had matches (probably a forbidden toy).

(4) Draw-a-man = 74. 4th Percentile: Mark's drawing is very immature; essential features are missing, proportion is bad; motor control is not good. The drawing points to emotional disturbance, and defective self-concept.

(5) Further remarks follow concerning perceptual ability, (Bender Gestalt, Frostig), and reading and arithmetic attainment levels.

(6) Summary. Well cared for physically; of average intelligence; low intellectual and perceptual maturity; and poor self concept; concerned about parental rejection and authority figure; some guilt feelings.

## 111      EXTRACTS FROM PLAY THERAPIST'S NOTES

### 1st Session

Quite happy, some chortling. Very much on go-keeps my attention continually, but pleasantly. Keeps saying how lucky he is (other boys don't come here, etc.) Very taken with a pile of C.O. jotters (he gets F.O. at school); thought this a rich prize - said burglars will come in and steal them - even a Headmaster (this spoken quite seriously). Given a jotter and gummed shapes (which he let scatter, accidentally all over floor). Kept on saying how lucky he was.

At end of the hour I suggested he see if his father had arrived. He said "He won't be here, he never is. He says he'll come at four o'clock but he doesn't". Left readily enough.

### 2nd Session

Trouble in playroom - getting violent, throwing things. Marie (another patient) comes in, Mark settles down, very well - polite, smiles - plays with toys - declines offer of drawing material with a smile "no good at drawing". Plays happily on floor with soldiers and tanks

During my brief absence to see a parent off he whoops and chortles in a fantasy game with soldiers - carries on after I enter but in a more controlled non-violent way.

Keeps engaging me in conversation. Says Mr. Smith (his school teacher) is a very nice man and asks me to ring him if he can help in any way - father later confirms this.

F somewhat anxious about Monday night incident while he was on night shift. Mark hit a little girl, woman chased him up a close and Mark hit her on back with a clothes pole causing some injury. Mark ranting and raving and continued to do so for two hours after being kept at home.

Other incidents mentioned - hit a small boy his own age, baited a crippled man with an iron railing.

Father says Mark has had these temper displays for years.

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1V

SUMMARY OF PSYCHIATRIST'S REPORT

Patient impulsive, restless, and anti-social showing strong hostility to the home, and has had very early oncurring identity problems. Mother wanted a child after one of her girl friends had one. She appears however to be frightened from the start, leaving most of the care to girl-friend or father. She works as a driver, and often goes out straight from work with girl friends, leaving father to care and look after all the needs of the patient. Mother appears to take the male role in home and father the female role. Mother shows signs of depression, and instability, with a pattern of blaming others for problems. Father isolated; withdraws into reading, and home care; showed anxiety symptoms. Possible personality defects in parents? Mother could be a heavy drinker?

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V    EXTRACTS FROM REPORT TO CLINIC FROM SCHOOL

Co-operative to teachers but wants to monopolize and say some naughty things as if wanting to shock. Sex appears to be on his mind and comes out with remarks to teachers who feel he is not fully aware of the meaning of these.

He kicks and is kicked by other children. Big boys hit him and he hits small boys. Has a small group of friends - one in particular - will kick his friend - no one immune.

Is not timid, yet not a leader. Has friends but quarrels with them too. Can organize but here is limited to a small group, he can influence. Is imaginative in play. If group don't do what he wishes, will quarrel. Has one friend - Paul - (a large oafish boy). Has been seen walking around hand-in-hand with this boy. At the same time often goes to the headmaster to complain Paul kicked him. Later both boys will again walk hand in hand. Going to and from school misbehaves. On buses causes friction and it is felt that some day he is liable to push someone off. Once threw a milk bottle off the bus at another boy. (There follows a series of suchlike incidents and the stealing is mentioned.) Father is more co-operative to talk to; mother always has a strained look, yet appears to be aggressive though this does not show on the surface. She tends to look for someone to blame for Mark's behaviour - the favourite area being the school. Headmaster has had a fairly lengthy experience in dealing with children from the most delinquent areas in Glasgow but he has never met anyone so badly behaved or so difficult to control as Mark.

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# A P P E N D I X 11

## RAW DATA FOR EACH GROUP

Data are presented here for each of the four main groups - Younger Boys, Older Boys, Younger Girls, Older Girls - and for the Brain-injured Group. 0 and 1 under Attitude represents Rejection and Acceptance, under M and D, 0 represents the absence of, and 1 the presence of distress or disturbance.

### Younger Boys (N = 74)

Case No.	Rdg	Arith	Attit	C.A.	I.Q.	N	E	M*	D**
1	7.8	6.1	0	7.8	130	13	16	1	0
2	6.8	6.8	1	7.5	93	10	9	0	1
3	7.2	-	1	7.9	106	10	20	0	0
4	6.2	5.6	0	7.9	103	12	17	0	1
5	8.8	5.8	1	7.5	127	18	17	0	1
6	6.6	6.1	0	8.3	112	12	23	0	1
7	7.4	6.9	1	8.4	94	14	17	0	0
8	6.4	5.5	0	8.7	93	9	17	0	1
9	10.4	6.8	1	8.4	112	10	17	0	1
10	10.0	7.4	1	8.6	119	14	21	0	1
11	5.9	6.9	0	8.7	121	9	9	0	1
12	7.7	-	1	8.1	99	21	8	0	0
13	6.6	-	0	8.6	112	18	16	0	0
14	8.0	6.0	1	8.4	101	18	12	0	0
15	9.7	-	1	8.7	81	20	18	1	0
16	7.1	-	0	8.7	94	17	6	1	1
17	6.9	-	1	8.4	84	17	13	0	0
18	7.3	5.6	0	8.8	103	13	13	0	1
19	5.8	6.5	1	8.5	102	9	15	0	1
20	8.0	7.5	0	8.7	114	20	21	0	1
21	7.3	-	0	8.0	99	14	21	0	0
22	8.1	-	0	8.0	121	12	14	1	1
23	8.3	6.3	1	8.9	90	12	11	0	1

\* M = Perinatal emotional maternal distress.

\*\* D = Parental emotional disturbance.

Case No.	Rdg.	Arith.	Attit.	C.A.	Vbl I.Q.	N	E	M	D
24	7.6	7.6	0	8.0	117	20	9	0	0
25	5.8	7.0	0	8.9	123	15	8	0	1
26	8.3	-	1	8.6	94	12	9	1	1
27	8.3	-	0	8.8	85	20	16	0	1
28	9.8	7.2	1	8.4	117	10	20	0	0
29	10.3	6.5	0	8.3	108	12	16	1	1
30	8.6	-	1	8.0	91	20	17	1	1
31	6.2	5.1	0	8.8	91	12	17	0	1
32	7.3	6.5	0	8.3	91	8	16	0	0
33	8.8	5.6	1	8.3	136	21	17	0	1
34	6.7	6.3	0	8.5	114	8	23	0	1
35	8.9	-	0	8.0	119	20	8	1	1
36	6.5	-	1	8.3	86	16	12	0	0
37	6.8	-	0	8.0	80	8	18	0	0
38	7.0	-	1	8.0	99	19	13	0	0
39	8.6	5.6	1	8.0	94	19	22	1	1
40	10.1	5.8	1	8.9	84	18	17	1	0
41	6.2	-	0	8.3	119	19	13	0	0
42	7.1	-	1	8.9	93	18	7	1	1
43	8.9	-	0	8.4	84	18	17	0	1
44	9.5	7.4	1	8.5	106	3	14	1	0
45	7.8	8.5	0	8.5	126	5	17	0	0
46	10.5	11.5	1	8.3	129	5	17	0	0
47	6.8	-	0	8.8	114	16	17	0	0
48	7.1	6.5	0	9.3	109	10	14	0	0
49	6.3	-	1	9.0	84	14	23	1	1
50	5.9	5.8	1	9.2	90	11	12	1	0

Case No.	Rdg	Arith.	Attit.	C.A.	Vbl I.Q	<u>A12</u>			
						N	E	M	D
51	12.8	10.4	1	9.4	130	20	18	0	1
52	9.1	-	1	9.4	94	18	18	1	1
53	9.5	-	1	9.1	103	18	16	1	0
54	11.9	10.5	1	9.2	123	9	21	0	1
55	9.9	-	1	9.3	107	19	23	1	1
56	8.9	9.2	1	9.3	124	14	21	0	0
57	5.3	-	1	9.3	97	14	20	0	1
58	9.2	-	1	9.2	105	12	22	1	1
59	11.8	6.0	0	9.0	111	13	11	1	1
60	10.3	10.5	1	9.1	114	18	12	1	0
61	5.7	-	0	9.3	80	5	8	1	1
62	9.7	-	0	9.3	109	20	10	1	0
63	6.3	5.6	0	9.4	83	4	14	1	1
64	6.8	5.5	0	9.0	106	10	11	0	0
65	7.3	-	1	9.5	84	12	23	1	1
66	5.9	5.2	1	9.1	87	10	13	1	0
67	9.5	8.5	1	9.1	117	15	19	0	1
68	7.2	10.9	1	9.4	91	17	18	0	0
69	5.5	-	1	9.3	102	6	19	0	1
70	8.7	9.0	1	9.0	114	14	17	0	1
71	8.0	8.3	0	9.3	103	4	17	1	0
72	11.0	11.4	0	9.4	122	19	17	0	1
73	8.3	7.5	1	9.3	97	13	12	0	1
74	9.0	-	1	9.0	130	15	21	0	1

Older Boys (N = 60)

Case No.	Rdg.	Arith.	Attit	C.A.	Vbl I.Q.	N	E	M	D
1	12.8	10.7	1	9.6	125	13	8	0	1
2	7.0	9.4	0	9.9	100	10	18	0	0
3	6.8	5.8	1	9.6	105	18	23	0	1
4	8.0	7.4	0	9.8	107	19	17	1	0
5	9.7	7.0	1	9.7	124	18	16	0	0
6	10.9	8.9	0	9.5	119	14	18	0	1
7	12.0	5.8	1	9.6	115	15	8	1	1
8	11.3	12.7	0	9.6	124	12	23	1	1
9	10.6	-	0	9.7	111	18	9	1	0
10	5.7	5.5	0	9.9	101	14	19	0	1
11	10.6	9.2	1	9.9	105	20	9	0	1
12	13.4	10.7	1	9.8	139	19	17	0	1
13	12.4	12.9	1	9.5	125	11	9	1	1
14	8.3	-	0	9.9	86	11	17	1	1
15	12.5	9.9	0	9.9	117	10	16	0	0
16	9.9	-	1	9.5	105	11	16	1	0
17	7.4	7.5	1	9.6	106	9	16	0	0
18	6.0	5.5	1	9.9	105	5	23	0	0
19	8.1	7.5	0	9.9	99	20	18	1	0
20	10.0	7.1	1	9.8	126	20	12	0	0
21	10.3	8.1	1	9.8	93	4	16	1	1
22	6.7	9.2	0	9.8	90	17	16	0	0
23	8.0	5.6	1	9.9	80	16	16	0	1
24	6.0	10.0	0	9.9	80	11	20	0	1
25	11.4	-	1	9.5	119	12	22	0	1
26	10.0	9.0	1	9.7	109	19	19	0	1
27	10.3	-	1	9.5	109	14	8	0	1

A14

Case No.	Rdg.	Arith.	Attit.	C.A.	Vbl I.Q	N	E	M	D
28	8.0	7.2	1	11.3	99	13	18	1	1
29	9.9	9.2	0	11.0	124	14	18	1	1
30	8.4	-	0	11.1	103	15	17	0	0
31	7.7	-	0	11.4	83	13	12	1	1
32	7.3	8.8	1	11.9	91	13	16	0	0
33	12.3	8.8	0	11.3	99	14	3	0	0
34	11.0	6.0	1	11.1	118	12	8	1	1
35	10.6	9.9	0	11.0	125	13	20	0	1
36	9.5	-	0	11.5	80	20	23	1	0
37	8.8	7.5	1	11.4	105	21	16	0	1
38	14.0	9.7	1	11.9	134	19	18	0	0
39	13.0	7.5	0	11.9	109	18	12	1	1
40	9.7	9.9	0	11.8	123	7	17	1	1
41	11.3	8.2	0	11.3	105	21	19	1	1
42	13.0	10.0	0	11.7	115	2	19	1	1
43	11.2	-	0	11.8	136	10	16	0	0
44	12.5	-	0	11.3	115	11	8	1	0
45	10.9	-	1	11.3	101	12	7	0	1
46	12.5	9.9	0	11.9	115	19	8	0	1
47	10.5	-	0	11.3	96	4	12	0	1
48	9.9	-	0	10.5	93	18	10	0	0
49	10.6	11.4	0	10.6	119	8	22	0	1
50	13.4	11.3	1	10.5	122	4	12	1	0
51	10.2	-	0	10.3	109	13	17	0	0
52	7.2	6.4	0	10.0	99	12	9	1	1
53	8.4	-	0	10.1	103	15	17	0	0
54	9.0	7.5	0	10.5	100	18	10	1	1
55	6.5	5.8	1	10.3	80	17	17	0	1
56	11.4	10.5	1	10.9	143	17	17	0	1
57	8.8	10.0	0	10.0	96	10	10	0	0

Case No.	Rdg.	Arith.	Attit.	C.A.	Vb1 I.Q.	N	E	M	D
58	10.3	-	1	11.4	100	18	4	0	0
59	8.8	-	0	11.9	94	12	15	0	0
60	11.8	-	0	11.1	127	12	19	0	1

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Younger Girls (N = 31)

Case No.	Rdg.	Arith.	Attit.	C.A.	Vb1 I.Q.	N	E	M	D
1	9.0	-	1	8.9	105	21	19	1	0
2	7.8	6.9	0	7.1	138	22	19	1	1
3	7.5	5.8	0	7.3	115	12	16	0	0
4	6.0	-	0	7.4	110	9	15	1	1
5	5.1	5.0	0	7.5	109	8	16	1	1
6	7.5	-	1	7.5	103	19	14	0	0
7	8.6	-	1	7.6	105	14	19	0	0
8	8.5	5.6	0	8.2	111	21	21	1	1
9	6.1	5.2	1	8.3	87	23	15	1	0
10	8.1	-	0	8.3	105	12	12	0	0
11	8.4	5.9	1	8.4	90	21	16	1	0
12	8.0	5.8	1	8.4	94	21	17	1	0
13	7.1	5.0	1	8.5	88	24	17	1	1
14	6.5	5.9	0	8.5	90	17	17	0	0
15	8.5	7.3	0	8.6	97	21	13	0	1
16	7.5	6.5	1	8.6	87	23	17	0	0
17	8.0	-	1	8.9	94	21	16	1	0
18	7.0	5.3	0	9.1	99	7	18	1	0
19	8.4	7.5	0	9.3	106	16	14	0	1
20	7.6	7.3	0	9.4	109	13	17	1	1
21	7.8	7.5	0	8.0	109	20	14	0	0
22	8.0	5.5	1	8.5	99	21	16	1	0

Case No.	Rdg.	Arith.	Attit.	C.A.	Vb1 I.Q.	N	E	M	D
23	8.8	5.9	1	8.9	99	21	19	0	0
24	6.8	6.5	0	7.8	105	14	16	0	1
25	9.6	6.3	0	9.3	105	17	15	0	1
26	8.9	7.8	1	9.4	106	10	18	1	0
27	7.9	6.9	1	8.4	126	14	16	0	1
28	8.0	7.3	0	8.5	111	21	9	1	1
29	8.5	-	1	8.9	101	21	18	0	0
30	7.0	-	1	7.9	101	15	12	1	1
31	7.9	-	1	8.5	109	18	14	0	0

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Older Girls (N = 34)

Case No.	Edg.	Arith.	Attit.	C.A	Vb1 I.Q.	N	E	M	D
1	11.2	-	1	9.6	126	18	16	1	1
2	11.5	8.9	0	9.5	124	10	21	0	0
3	10.6	8.5	0	9.6	115	19	9	0	1
4	8.3	7.5	1	9.6	80	14	16	0	1
5	8.9	8.5	1	9.9	94	15	16	0	1
6	6.0	5.8	1	9.9	87	13	17	0	1
7	8.3	7.4	0	10.1	84	20	16	1	0
8	7.5	8.5	0	10.4	88	19	16	0	0
9	9.2	8.5	0	10.5	114	9	17	0	0
10	12.1	11.2	0	10.8	117	9	15	1	1
11	9.0	-	1	10.9	94	16	13	1	0
12	10.8	8.8	1	11.0	103	10	21	0	0
13	12.9	9.3	1	11.0	124	21	18	1	1
14	13.0	9.4	0	11.3	115	22	11	0	0
15	12.9	-	1	11.4	99	7	12	1	1
16	8.3	9.5	1	11.4	83	18	15	0	0
17	9.7	-	0	11.4	86	17	14	0	0
18	12.0	9.1	0	11.5	100	16	11	1	0
19	10.3	5.9	0	11.5	112	18	20	1	0
20	10.6	-	0	11.6	87	4	14	1	1
21	10.8	9.5	1	11.6	101	18	14	1	1
22	11.4	9.8	0	11.8	114	13	19	1	1
23	7.5	7.0	0	11.8	84	12	12	1	1
24	8.4	7.5	0	11.9	94	8	10	1	1

Case No.	Rdg.	Arith.	Attit.	C.A.	I.Q.	N	E	M	D
25	8.7	10.5	0	11.9	94	12	23	1	1
26	9.9	10.8	0	11.9	105	10	21	0	1
27	11.8	13.0	1	12.0	99	5	13	1	1
28	11.6	10.0	1	12.0	90	21	18	1	1
29	10.8	9.5	1	12.1	99	18	14	1	1
30	12.4	10.3	1	12.1	127	8	21	1	0
31	8.9	7.5	0	12.3	86	13	15	1	0
32	11.9	8.9	0	12.3	89	14	16	0	0
33	11.5	11.0	0	12.4	101	18	20	1	0
34	9.9	-	1	12.4	103	20	18	0	0

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RAW DATA - BRAIN INJURED CHILDREN (N=34)

Case No.	Obtained R. A.	Attitude	C.A.	I.Q.	N	E	M	D
1	7.9	1	7.8	112	18	20	1	0
2	9.1	1	10.6	93	18	10	1	1
3	5.5	1	10.6	94	20	16	0	0
4	5.9	1	8.6	97	20	19	0	0
5	5.0	0	7.1	86	18	15	1	0
6	5.9	0	8.9	123	15	8	0	1
7	6.6	0	9.3	81	18	15	0	1
8	7.5	0	8.0	117	21	20	0	0
9	5.0	1	9.9	80	21	21	0	1
10	9.4	0	7.8	112	15	16	0	0
11	8.0	0	8.2	93	17	20	0	0
12	6.5	0	8.9	94	12	6	1	0
13	5.6	1	10.4	80	17	17	0	1
14	7.5	1	9.7	112	18	16	0	0
15	6.9	1	8.0	86	15	18	0	0
16	7.1	0	6.5	111	16	19	0	1
17	7.0	0	8.0	97	19	13	0	0
18	7.8	1	7.6	86	16	14	0	1
19	7.3	0	10.1	84	20	16	1	0
20	8.7	1	8.0	93	17	16	1	1
21	7.9	0	7.4	117	23	20	0	0
22	6.1	1	8.3	83	23	15	0	0
23	8.9	0	9.3	112	20	19	1	1
24	9.9	0	8.1	80	18	16	1	0

Case No.	Obtained R. A.	Attitude	C.A.	I.Q	N	E	M	D
25	12.0	0	11.6	103	16	11	1	0
26	6.2	0	8.3	108	19	13	0	0
27	11.7	1	12.0	90	21	18	1	1
28	10.6	0	9.4	121	17	19	0	0
29	7.1	0	8.9	93	18	7	1	1
30	8.9	0	8.5	84	20	17	0	1
31	6.0	1	9.9	105	5	23	0	0
32	9.8	0	7.9	114	6	10	0	1
33	5.9	1	8.9	94	7	12	0	1
34	6.9	0	9.0	94	9	11	0	0

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A P P E N D I X 111REGRESSION ANALYSES FOR THE PREDICTION  
OF READING1. YOUNGER CHILDRENSUMMARY OF THE INPUT

	<u>MEAN</u>	<u>VARIANCE</u>	<u>S.D.</u>
Y	7.94947	2.55721	1.59913
X <sub>1</sub>	8.60737	.334307	.578193
X <sub>2</sub>	104.200	206.651	14.3754

CORRELATION MATRIX

Y	1.0		
X <sub>1</sub>	.208777	1.0	
X <sub>2</sub>	.388944	-.131498	1.0

ANALYSIS OF VARIANCE

	<u>d.f.</u>	<u>S.S.</u>	<u>M.Sq.</u>
REGRESSION	2	52.8892	26.4446
RESIDUAL	92	187.488	2.03791
TOTAL	94	240.377	2.55721

	<u>REGR. COEFF.</u>	<u>95% CON</u>	<u>S.E.</u>	<u>COEFF/SE</u>	<u>BETA</u>
-	3.25854	5.14205	2.58761	-1.259	
	.731523	.510481	.256887	2.848	.2645
	.047136	.020532	.010332	4.562	.4237

$R^2 = .220026$ ,  $R = .47$       S.E.Est = 1.43

F - RATIO = 12.9763      (P < .01)

2. OLDER CHILDRENSUMMARY OF THE INPUT

	<u>MEAN</u>	<u>VARIANCE</u>	<u>S.D</u>
Y	10.0287	3.95476	1.98866
X <sub>1</sub>	10.7596	.858563	.926587
X <sub>2</sub>	105.351	227.994	15.0995

CORRELATION MATRIX

Y	1.0		
X <sub>1</sub>	.260896	1.0	
X <sub>2</sub>	.610567	-.131395	1.0

ANALYSIS OF VARIANCE

	d.f	S.S	M.Sq
REGRESSION	2	180.660	90.3298
RESIDUAL	91	187.133	2.05640
TOTAL	93	367.792	3.95476

<u>REGR. COEFF.</u>	<u>95% CON</u>	<u>S.E</u>	<u>COEFF/SE</u>	<u>BETA</u>
- 7.09152	4.27660	2.15179	-3.296	
.744983	.321742	.161885	4.602	.3471
.086421	.019744	.009934	8.699	.6562

R<sup>2</sup> = .491200.      R = .701      S. Est = 1.43

F - RATIO = 43.9261 (P < .01)

A P P E N D I X 1VPREDICTED READING AGES1. YOUNGER BOYS

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE(RESIDUAL)
6.80000	6.61148	.188519	.132058
7.80000	8.57495	-.774951	-.542852
7.20000	7.51685	-.316851	-.221954
6.20000	7.37544	-1.17544	-.823397
8.80000	8.21409	.585913	.410431
6.60000	8.09227	-1.49227	-1.04533
7.40000	7.31699	.830135E-01	.581508E-01
6.40000	7.48931	-1.08931	-.763058
10.4000	8.16543	2.23457	1.56532
10.0000	8.64168	1.35832	! .951502
5.90000	8.80910	-2.90910	-2.03782
7.70000	7.33321	.366793	.256938
6.60000	8.31173	-1.71173	-1.19906
8.00000	7.64693	.353065	.247321
9.70000	6.92368	2.77632	1.94481
7.10000	7.53644	-.436443	-.305728
6.90000	6.84563	.543684E-01	.380850E-01
7.30000	8.03382	-.733815	-.514036
5.00000	7.76722	-2.76722	-1.93843
8.00000	8.47915	-.479153	-.335646
7.30000	7.44860	-.148597	-.104092
8.10000	8.72126	-.621255	-.435188
8.30000	7.49421	.805794	.564457
7.60000	7.26005	.339945	.238131
5.80000	8.86114	-3.06114	-2.14432
8.30000	7.69897	.601031	.421021
8.30000	7.18538	1.11462	.780792
9.80000	8.58964	1.21036	.847852
10.3000	7.99800	2.30200	1.61255
8.60000	7.02438	1.57562	1.10372
6.20000	7.46819	-1.26819	-.888364
7.30000	7.10243	.197572	.138399
8.80000	9.22352	-.423525	-.296679

# A P P E N D I X 1V

## 1. YOUNGER BOYS CONTD

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE (RESIDUAL)
6.70000	8.33285	-1.63285	-1.14381
8.90000	8.20276	.697235	.488412
6.50000	6.86675	-.366750	-.256908
6.80000	6.36448	.435520	.305081
7.00000	7.26005	-.260055	-.182168
8.60000	7.02438	1.57562	1.10372
10.1000	7.21139	2.88861	2.02346
6.20000	8.42222	-2.22222	-1.55666
7.10000	7.63561	-.535612	-.375196
8.90000	6.84563	2.05437	1.43908
9.50000	7.95576	1.54424	1.08173
7.80000	8.89847	-1.09847	-.769479
10.5000	8.89358	1.60642	1.12530
6.80000	8.55231	-1.75231	-1.22749
7.10000	8.68239	-1.58239	-1.10846
6.30000	7.28455	-.984545	-.689672
5.90000	7.71366	-1.81366	-1.27047
12.8000	.74539	3.05461	2.13975
9.10000	8.04851	1.05149	.736567
9.50000	8.25327	1.24673	.873331
11.9000	9.26913	2.63087	1.84292
9.90000	8.58812	1.31188	.918971
8.90000	9.38942	-.489422	-.342839
5.30000	8.11676	-2.81676	-1.97314
9.20000	8.42070	.779305	.545902
11.8000	8.55720	3.24280	2.27157
10.3000	8.77176	1.52824	1.07053
5.70000	7.31546	-1.61546	-1.13163
9.70000	8.68239	1.01761	.712834
6.30000	7.53002	-1.23002	-.861626

A P P E N D I X 1V1. YOUNGER BOYS CONTD.

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE(RESIDUAL)
6.80000	8.32153	-1.52153	-1.06583
7.30000	7.50400	-.204002	-.142903
5.90000	7.49910	-1.59910	-1.12017
9.50000	8.91317	.586831	.411074
7.20000	7.90710	-.707103	-.495324
5.50000	8.35244	-2.85244	-1.99813
8.70000	8.69861	.138992E-02	.973637E-03
8.00000	8.39958	-.399576	-.279903
11.0000	9.36830	1.63170	1.14300
8.30000	8.11676	.183237	.128357
9.00000	9.45278	-.452778	-.317170

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2 OLDER BOYS

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE (RESIDUAL)
12.8000	10.8629	1.93707	1.35080
7.00000	8.92591	-1.92591	-1.34302
6.80000	9.13452	-2.33452	-1.62796
8.00000	9.45635	-1.45635	-1.01558
9.70000	10.8510	-1.15101	-.802649
10.9000	10.2699	.630090	.439388
12.0000	9.99872	2.00128	1.39557
11.3000	10.7765	.523487	.365049
10.6000	9.72754	.872460	.608403
5.70000	9.01233	-3.31233	-2.30982
10.6000	9.35801	1.24199	.866091
13.0000	12.2218	.778177	.542655
12.4000	10.7884	1.61156	1.12381
8.30000	7.71601	.583987	.407239
12.5000	10.3951	2.10494	1.46786
9.99000	9.06002	.839983	.585755
7.40000	9.22094	-1.82094	-1.26982
6.00000	9.35801	-3.35801	-2.34168
8.10000	8.83949	-.739485	-.515674
10.0000	11.0984	-1.09835	-.765927
10.3000	8.24646	2.05354	1.43202
6.70000	7.98720	-1.28720	-.897618
8.00000	7.19749	.802512	.559626
6.00000	7.19749	-1.19749	-.835059
11.4000	10.2699	1.13009	.788059
10.0000	9.55470	.445302	.310528
10.3000	9.40570	.894299	.623632
8.00000	9.88246	-1.88246	-1.31272
9.90000	11.8195	-1.91949	-1.33854
8.40000	10.0791	-1.67915	-1.17094

2 OLDER BOYS CONTD

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE(RESIDUAL)
7.70000	8.57422	-.874225	-.609634
7.30000	9.63308	-2.33808	-1.63044
12.3000	9.88246	2.41754	1.68585
11.0000	11.3755	-.375462	-.261825
10.6000	11.9059	-1.30591	-.910666
9.50000	8.38946	1.11054	.774426
8.80000	10.4755	-1.67548	-1.16839
14.0000	13.3542	.645817	.450355
13.0000	11.1937	1.80634	1.25964
9.70000	12.3291	-2.62905	-1.83335
11.3000	10.4010	.899013	.626920
13.0000	11.5632	1.43681	1.00195
11.2000	13.4525	-2.25253	-1.57078
12.5000	11.2652	1.23480	.861081
10.9000	10.0553	.844697	.589043
12.5000	11.7122	.787815	.549376
10.5000	9.62320	.876802	.611431
9.90000	8.76795	1.13205	.789427
10.6000	11.0894	-.489391	-.341273
13.4000	11.2742	2.12584	1.48244
10.2000	10.0017	.198313	.138292
7.20000	8.91398	-1.71398	-1.19523
8.40000	9.33417	-.934165	-.651433
9.00000	9.37290	-.372896	-.260036
6.50000	6.49548	-.995481	-.694191
11.4000	13.3870	-1.98699	-1.38561
8.80000	8.65472	.145279	.101309
10.3000	10.0434	.256620	.178952
8.80000	9.89735	-1.09735	-.765226
11.8000	12.1533	-.353250	-.246336

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3. YOUNGER GIRLS

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE (RESIDUAL)
9.0000	8.20124	.798762	.559531
7.8000	8.43997	-.639969	-.448297
7.5000	7.50216	-.002157	-.001511
6.0000	7.33963	-1.33963	-.938410
5.1000	7.36565	-2.26565	-1.58708
7.5000	7.08248	.417165	.292223
8.6000	7.25026	1.34974	.945491
8.5000	7.97199	.528015	.369873
6.1000	6.91389	-.813886	-.570126
8.1000	7.76232	.337675	.236541
8.4000	7.12844	1.27156	.890722
8.0000	7.31699	.683013	.478450
7.1000	7.10733	-.007326	-.005132
6.5000	7.20160	-.701597	-.491467
8.5000	7.60470	.895302	.627158
7.5000	7.13334	.366657	.256843
8.0000	7.68275	.317252	.222235
7.0000	8.06473	-1.06473	-.745841
8.4000	8.54098	-.140983	-.098758
7.6000	8.75554	-1.15554	-.809455
7.8000	7.720		
8.0000	7.616	.3840	.268993
8.8000	7.909	.8910	.624148
6.8000	6.386	-.5860	-.410494
9.6000	8.484	1.1160	.781761
8.9000	8.604	.296	.207349
7.9000	8.812	-.912	-.638858
8.0000	8.180	-.180	-.126090
8.5000	8.003	.497	.348150
7.0000	7.271	-.271	-.189836
7.9000	8.086	-.186	-.130293

4 OLDER GIRLS

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE	(RESIDUAL)
11.2000	10.9494	.250645		.174785
11.5000	10.7020	.797985		.556469
10.6000	9.99872	.601275		.419294
8.30000	6.97399	1.32601		.924681
8.90000	8.40738	.492619		.343524
6.00000	7.80243	-1.80243	-1.25691	
8.30000	7.69217	.607832		.423867
7.50000	8.26135	-.761346	-.530919	
9.20000	10.5828	-1.38279	-.964277	
12.1000	11.0655	1.03445		.721368
9.00000	9.15236	-.152363	-.106249	
10.8000	10.0046	.795350		.554631
12.9000	11.8195	1.08051		.753486
13.0000	11.2652	1.73480		1.20975
12.9000	9.95696	2.94304		2.05231
8.30000	8.57422	-.274225	-.191228	
9.70000	8.83349	.866513		.604256
12.0000	10.1179	1.88212		1.31248
10.3000	11.1549	-.854930	-.596178	
10.6000	9.06890	1.53110		1.06770
10.8000	10.2788	.521202		.363456
11.4000	11.5513	-.151266	-.105484	
7.50000	8.95864	-1.45864	-1.01717	
8.40000	9.89735	-1.49735	-1.04416	
8.70000	9.89735	-1.19735	-.834960	
9.90000	10.8480	-.947976	-.661064	
11.8000	10.4039	1.39605		.973525
11.6000	9.62616	1.97384		1.37644
10.8000	10.4784	.321553		.224232
12.4000	12.8982	-.498233	-.347439	
8.90000	9.50397	-.603972	-.421175	
11.9000	9.76323	2.13677		1.49006
11.5000	10.8748	.625216		.435989
9.90000	11.0476	-1.14763	-.800288	

5. BRAIN-INJURED CHILDREN

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE	(RESIDUAL)
7.9	7.727	.173		0.121
9.1	8.842	.258		0.180
5.5	8.929	-3.429	-2.391	
5.9	7.605	-1.705	-1.194	
5.0	5.989	-0.989	-0.693	
5.9	9.049	-3.149	-2.205	
6.6	7.363	-0.763	-0.534	
7.5	8.109	-0.609	-0.426	
5.0	7.197	-2.197	-1.532	
9.4	7.727	1.673		1.172
8.0	7.114	.886		0.620
6.5	7.956	-1.456	-1.020	
5.6	7.533	-1.933	-1.348	
7.5	9.767	-2.267	-1.581	
6.9	6.639	.261		0.183
7.1	8.180	-1.080	-0.756	
7.0	7.156	-0.156	-0.109	
7.8	6.346	1.454		1.018
7.3	7.657	-0.357	-0.249	
8.7	6.968	1.732		1.213
7.9	7.657	.243		0.170
6.1	6.718	-0.618	-0.433	
8.9	8.813	0.087		0.061
9.9	6.430	3.470		2.430
12.0	10.408	1.592		1.110
6.2	7.893	-1.693	-1.186	
11.7	9.588	2.112		1.473
10.6	9.308	1.292		0.905
7.1	7.672	-0.572	-.401	
8.9	6.911	1.989		1.393
6.0	9.314	-3.314	-2.311	
9.8	7.882	1.918		1.343
5.9	7.674	-1.774	-1.242	
6.9	7.747	-0.847	-0.593	

REGRESSION ANALYSES FOR THE  
PREDICTION OF ARITHMETIC.

1. YOUNGER CHILDREN

SUMMARY OF THE INPUT

	<u>MEAN</u>	<u>VARIANCE</u>	<u>S.D</u>
Y	6.90758	2.53856	1.59328
X <sub>1</sub>	8.61061	.321886	.567350
X <sub>2</sub>	107.000	192.185	13.8631

CORRELATION MATRIX

Y	1.0		
X <sub>1</sub>	.362251	1.0	
X <sub>2</sub>	.438320	-.193061	1.0

ANALYSIS OF VARIANCE

	d.f	S.S	M.Sq
REGRESSION	2	65.9285	32.9642
RESIDUAL	63	99.0777	1.57266
TOTAL	65	165.006	2.53856

REGR. COEFF	95%CON	S.E.	COEFF/SE	BETA
-10.8090	5.81031	2.90627	-3.719	-
1.30354	.558626	.279420	4.665	.4642
.060676	.022862	.011436	5.306	.5279

$R^2 = .399551$ ,       $R = .63$        $S.E.Est. = 1.248$

F - RATIO = 20.9608      ( $P < .01$ ).

2. OLDER CHILDRENSUMMARY OF THE INPUT

	<u>MEAN</u>	<u>VARIANCE</u>	<u>S.D</u>
Y	8.75714	3.31147	1.81974
X <sub>1</sub>	10.7300	.900971	.949195
X <sub>2</sub>	106.057	238.258	15.4356

CORRELATION MATRIX.

Y	1.0		
X <sub>1</sub>	.224948	1.0	
X <sub>2</sub>	.413012	-.088848	1.0

ANALYSIS OF VARIANCE.

	d.f	S.S	M.Sq.
REGRESSION	2	54.7422	27.3711
RESIDUAL	67	173.749	2.59327
TOTAL	69	228.491	3.31147

<u>REGR.COEFF.</u>	<u>95% CON</u>	<u>S.E</u>	<u>COEFF/SE</u>	<u>BETA</u>
-2.12495	5.35435	2.68128	-.7925	
.505599	.409476	.205052	2.466	.2637
.051434	.025180	.012609	4.081	.4364

$R^2 = .239581.$        $R = .49$       S.E. Est. = 1.5

F - RATIO = 10.5546      (P < .01)

A P P E N D I X VI

PREDICTED ARITHMETIC AGES

1. YOUNGER BOYS

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE (RESIDUAL)
6.10000	7.24645	-1.14645	-.914193
6.80000	4.61039	2.18961	1.74602
5.60000	5.73856	-.138565	-.110493
5.80000	6.67336	-.873364	-.696430
6.10000	6.80606	-.706059	-.563020
6.90000	5.84425	1.05575	.841865
5.50000	6.17464	-.674638	-.537964
6.80000	6.93641	-.136413	-.108777
7.40000	7.62185	-.221849	-.176905
6.90000	7.87355	-.973554	-.776323
6.00000	6.87574	-.875737	-.698323
5.60000	6.91175	-1.31175	-1.04600
6.50000	6.46001	.399892E-01	.318878E-01
7.50000	7.44882	.511752E-01	.408077E-01
6.30000	6.25332	.466814E-01	.372243E-01
7.60000	6.71833	.881624	.703017
7.00000	8.25561	-1.25561	-1.00124
7.20000	7.23979	-.397906E-01	-.317295E -01
6.50000	6.62403	-.124032	-.989049E -01
5.10000	6.18364	-1.08364	-.864107
6.50000	5.53187	.968128	.771996
5.60000	8.26227	-2.66227	-2.12293
6.30000	7.18812	-.888118	-.708195
5.60000	5.32284	.277162	.221012
5.80000	5.88927	-.892653E-01	-.711811E-01
7.40000	6.70271	.697287	.556024
8.50000	7.91622	.583776	.465509
11.5000	7.83754	3.66246	2.92048
6.50000	7.92757	-1.42757	-1.13836
5.80000	6.64438	-.844380	-.673318
10.4000	9.33211	1.06789	.851548
10.5000	8.64667	1.85333	1.47786
9.20000	8.83770	.362298	.288900

1. YOUNGER BOYS CONTD.

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE (RESIDUAL)
6.00000	7.65786	-1.65786	-1.32200
10.5000	7.97024	2.52976	2.01726
5.60000	6.48036	-.880358	-.702007
5.50000	7.35448	-1.85448	-1.47878
5.20000	6.33200	-1.13200	-.902669
8.50000	8.15227	.347734	.277287
10.9000	6.96576	3.93424	3.13721
9.00000	7.83989	1.16011	.925088
8.30000	7.56352	.736485	.587281
11.4000	8.84670	2.55330	2.03603
7.50000	7.19946	.300538	.239652
6.90000	6.81938	.806198E-01	.642872E-01
5.80000	5.68455	.115450	.920615E-01
5.00000	5.58120	-.581203	-.463458
5.60000	6.61503	-1.01503	-.809396
5.20000	5.28917	-.891702E-01	-.711053E-01
5.90000	5.60155	.298450	.237987
5.80000	5.84425	-.442527E-01	-.352876E-01
5.90000	5.73190	.168096	.134042
5.00000	5.61055	-.610553	-.486862
7.30000	6.28699	1.01301	.807788
6.50000	5.68023	.819769	.653693
5.30000	7.06011	-1.76011	-1.40353
7.50000	7.74554	-.245542	-1.95798
7.30000	8.05792	-.757922	-.604376
7.50000	6.23297	1.26703	1.01034
5.50000	6.27798	-.777984	-.620373
5.90000	6.79940	-.899399	-.717191
6.50000	5.72956	.770438	.614356
6.30000	7.68487	-1.38487	-1.10431
7.80000	7.87590	-.758958E-01	-.605201E-01
6.90000	7.78587	-.885871	-.706403
7.30000	7.00609	.293909	.234366

2. OLDER BOYS

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE (RESIDUAL)
10.7000	9.16049	1.53951	.956001
9.40000	8.02583	1.37417	.853327
5.80000	8.13142	-2.33142	-1.44776
7.40000	8.33545	-.935447	-.580892
7.00000	9.15960	-2.15960	-1.34106
8.90000	8.80121	.987899E-01	.613463E-01
5.80000	8.64596	-2.84596	-1.76727
12.7000	9.10904	3.59096	2.22991
5.50000	8.07729	-2.57729	-1.60044
9.20000	8.28310	.916900	.569374
10.7000	9.98196	.718040	.445887
12.9000	9.10993	3.79007	2.35355
9.90000	8.90054	.999457	.620641
7.50000	8.18287	-.682874	-.424050
5.50000	8.28310	-2.78310	-1.72824
7.50000	7.97438	-.474379	-.294579
7.10000	9.31306	-2.21306	-1.37426
8.10000	7.61510	.484902	.301113
9.20000	7.46074	1.73926	1.08004
5.60000	6.99676	-1.39676	-.867358
10.0000	6.99676	3.00324	1.86494
9.00000	8.38779	.612205	.380166
7.20000	8.68222	-1.48222	-.920424
9.20000	9.81688	-.616876	-.383066
8.80000	8.57395	.226052	.140373
8.80000	8.68222	.117783	.731405E-01
6.00000	9.55871	-3.55871	-2.20988
9.90000	9.86833	.316709E-01	.196669E-01
7.50000	9.04150	-1.54150	-.957236
9.70000	10.7864	-1.08645	-.674661

2. OLDER BOYS CONTD.

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE /SE	(RESIDUAL)
7.50000	9.50011	-2.00011	-1.24202	
9.90000	10.1699	-.269901	-.167602	
8.20000	8.99094	-.790938	-.491155	
10.0000	9.70771	.292287		.181504
9.90000	9.80883	.911674E-01		.566129E-01
11.4000	9.35737	2.04263		1.26843
11.3000	9.46117	1.83883		1.14187
6.40000	8.02494	-1.62494	-1.00905	
7.50000	8.32919	-.829192	-.514910	
5.80000	7.19900	-1.39900	-.868749	
10.5000	10.7439	-.243933	-.151477	
10.0000	7.87058	2.12942		1.32232

3. YOUNGER GIRLS

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE	(RESIDUAL)
6.9	6.81887	.08112		.065002
5.8	6.97705	-1.17705	-.943149	
5.0	5.58088	-.58088	-.465449	
5.6	6.61472	-1.01472	-.813082	
5.2	5.28900	-.08900	-.071317	
5.9	5.60137	.29862		.239285
5.8	5.84405	-.04405	-.035298	
5.0	5.61039	-.61039	-.489095	
5.9	5.73173	.16827		.134832
7.3	6.28677	1.01322		.811877
6.5	5.68007	.819922		.656989
5.3	7.05990	-1.75990	-1.410183	
7.5	7.74531	-.245314	-.196566	
7.3	8.05768	-.757682	-.607117	
7.5	6.23267	1.26733		1.015489
5.5	6.27776	-.77776	-.623205	
5.9	6.79919	-.89919	-.720506	
6.5	5.72927	.77072		.617569
6.3	7.68464	-1.38464	-1.10949	
7.8	7.87567	-.07567	-.060635	
6.9	7.78549	-.88549	-.709529	
7.3	7.00580	.29420		.235737

4. OLDER GIRLS

OBSERVED	CALCULATED	DIFFERENCE	DIFFERENCE/SE (RESIDUAL)
8.90000	9.05848	-.158478	-.984111E-01
8.50000	8.64596	-.145956	-.906353E-01
7.50000	6.84508	.654917	.406689
8.50000	7.71711	.782888	.486156
5.80000	7.35694	-1.55694	-.966823
7.40000	7.30370	.963039E-01	.598026E-01
8.50000	7.66119	.838810	.520882
8.50000	9.04954	-.549541	-.341253
11.2000	9.35558	1.84442	1.14534
8.80000	8.73635	.636483E-01	.395242E-01
9.30000	9.81688	-.516876	-.320968
9.40000	9.50547	-.105473	-.654967E-01
9.50000	7.90952	1.59048	.987652
9.10000	8.83479	.265210	.164689
5.90000	8.21645	-2.31645	-1.43847
9.50000	8.93680	.563196	.349732
9.80000	9.70682	.931807E-01	.578632E-01
7.00000	8.16321	-1.16321	-.722330
7.50000	8.72831	-1.22831	-.762752
10.5000	8.72831	1.77169	1.10018
10.8000	9.29430	1.50570	.935008
13.0000	9.03614	3.96386	2.46147
10.0000	8.57305	1.42695	.886101
9.50000	9.08670	.413304	.256653
10.3000	10.5274	-.227395	-.141207
7.50000	8.51892	-1.01892	-.632727
8.90000	8.72473	.175266	.108836
11.0000	9.85582	1.14418	.710512

APPENDIX VIISCHONELL WORD READING TEST

tree	little	milk	egg	book
school	sit	frog	playing	bun
flower	road	clock	train	light
picture	think	summer	people	something
dream	downstairs	biscuit	shepherd	thirsty
crowd	sandwich	beginning	postage	island
saucer	angel	ceiling	appeared	gnome
canary	attractive	imagine	nephew	gradually
smoulder	applaud	disposal	nourished	diseased
university	orchestra	knowledge	audience	situated
physics	campaign	choir	intercede	fascinate
forfeit	siege	recent	plausible	prophecy
colonel	soloist	systematic	slovenly	classification
genuine	institution	pivot	conscience	heroic
pneumonia	preliminary	antique	susceptible	enigma
oblivion	scintillate	satirical	sabre	beguile
terrestrial	belligerent	adamant	sepulchre	statistics
miscellaneous	procrastinate	tyrannical	evangelical	grotesque
ineradicable	judicature	preferential	homonym	fictitious
rescind	metamorphosis	somnambulist	bibliography	idiosyncrasy

# A P P E N D I X VIII

## BURT ARITHMETIC TEST

472

### MENTAL AND SCHOLASTIC TESTS

#### ARITHMETIC (Written Ungraded Tests)

[Tests 11 to 14]

#### Four Fundamental Rules<sup>1</sup>

*For Instructions, see pp. 396-9. For Norms, see Tables LI-LIV, pp. 511-12.*

#### Test 11. (i) ADDITION

9 2	4 5	3 6	8 4	4 6	2 3	7 8	9 6	3 4	6 2
2 7	3 7	9 3	7 8	9 2	6 4	2 3	8 9	6 2	5 9
5 4	9 8	5 2	5 3	7 9	5 8	9 2	6 8	5 9	7 7
9 5	7 6	3 4	6 9	4 8	2 5	3 5	7 4	8 6	8 6
—	—	—	—	—	—	—	—	—	—
7 6	3 8	2 5	8 3	9 7	7 9	2 7	4 5	7 9	9 5
9 8	5 9	3 6	5 2	5 8	6 4	5 4	7 9	5 3	6 3
5 3	9 7	8 3	6 7	4 6	5 3	6 9	6 2	6 8	3 9
4 8	4 5	9 5	8 9	8 5	7 6	2 5	9 6	3 7	4 2
—	—	—	—	—	—	—	—	—	—
8 5	4 6	8 9	3 5	2 5	6 7	5 9	5 4	9 4	3 6
6 8	5 7	4 7	8 4	4 2	7 2	3 2	2 9	3 7	4 5
2 4	8 4	2 4	4 2	3 7	9 6	8 5	3 6	6 8	8 4
7 3	3 9	9 7	2 3	2 2	5 3	7 7	9 8	5 9	4 2
—	—	—	—	—	—	—	—	—	—
5 3	8 7	4 9	5 4	7 9	5 2	7 2	2 3	5 8	8 2
4 5	9 6	8 6	6 3	4 8	7 4	8 3	9 8	9 6	3 6
3 7	2 8	7 5	8 6	2 5	8 9	4 6	3 9	2 5	4 7
8 4	6 3	9 3	5 2	5 9	6 4	5 9	6 7	3 4	9 8
—	—	—	—	—	—	—	—	—	—
6 9	5 8	6 7	9 7	3 4	9 2	4 3	6 8	6 8	2 3
2 5	8 7	8 9	4 5	2 5	7 5	2 6	9 5	3 4	7 9
9 2	3 2	7 5	7 3	7 3	4 6	9 5	4 9	2 5	9 4
8 7	5 9	2 6	5 2	6 4	3 7	6 8	7 3	4 2	2 8
—	—	—	—	—	—	—	—	—	—

<sup>1</sup> The test-sheets, printed for the children, should, of course, be set up in type considerably larger than the above—12 point at least, with modern face.

## APPENDIXES TO MEMORANDUM III

473

## Test 12. (ii) SUBTRACTION

9 8 0 2  
6 2 4 67 7 2 1  
1 8 4 14 9 4 4  
1 2 9 53 2 0 8  
1 7 3 85 8 3 1  
3 6 7 68 7 8 1  
5 7 9 58 0 7 9  
4 5 9 93 2 5 3  
2 1 9 55 1 0 6  
2 8 9 28 7 5 6  
3 5 6 99 6 5 3  
3 8 7 37 6 3 4  
4 6 4 87 8 1 2  
3 1 7 85 0 1 4  
1 6 9 44 9 5 2  
2 8 8 97 2 0 6  
2 3 2 16 2 6 5  
3 5 7 59 2 3 1  
1 2 8 29 8 4 3  
1 7 6 99 1 3 6  
7 4 6 56 4 0 3  
4 3 1 89 4 0 5  
5 7 8 49 1 0 7  
4 3 7 65 8 2 2  
1 8 9 37 0 2 2  
3 3 7 55 7 0 1  
2 6 9 48 5 0 2  
3 7 4 29 6 4 0  
5 4 8 14 4 3 8  
1 5 7 23 4 0 2  
1 4 2 57 1 0 9  
4 2 6 37 9 1 6  
2 9 5 85 0 3 9  
3 7 4 86 0 5 4  
2 8 6 38 5 1 8  
1 5 9 96 8 3 5  
3 4 6 96 2 5 7  
1 6 8 77 3 6 4  
5 3 7 94 6 7 8  
2 9 8 78 6 7 0  
6 5 9 59 3 4 6  
1 9 6 68 2 1 2  
5 8 3 17 5 3 1  
1 4 5 79 2 1 3  
6 4 8 29 1 1 4  
4 1 6 73 9 5 2  
2 8 9 88 0 6 5  
6 5 7 49 7 0 3  
6 5 4 99 4 2 7  
2 7 9 66 6 8 1  
4 6 9 6

JUNIOR EYSENCK PERSONALITY INVENTORY

E ☐ N ☐ L ☐

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**REMEMBER TO ANSWER EACH QUESTION**

	YES	NO
1. Do you like plenty of excitement going on around you? .....	<input type="radio"/>	<input type="radio"/>
2. Do you often need kind friends to cheer you up? .....	<input type="radio"/>	<input type="radio"/>
3. Do you nearly always have a quick answer when people talk to you?.....	<input type="radio"/>	<input type="radio"/>
4. Do you sometimes get cross? .....	<input type="radio"/>	<input type="radio"/>
5. Are you moody? .....	<input type="radio"/>	<input type="radio"/>
6. Would you rather be alone instead of meeting other children? .....	<input type="radio"/>	<input type="radio"/>
7. Do ideas run through your head so that you cannot sleep? .....	<input type="radio"/>	<input type="radio"/>
8. Do you always do as you are told at once? .....	<input type="radio"/>	<input type="radio"/>
9. Do you like practical jokes? .....	<input type="radio"/>	<input type="radio"/>
10. Do you ever feel "just miserable" for no good reason? .....	<input type="radio"/>	<input type="radio"/>
11. Are you rather lively? .....	<input type="radio"/>	<input type="radio"/>
12. Have you ever broken any rules at school? .....	<input type="radio"/>	<input type="radio"/>
13. Do lots of things annoy you? .....	<input type="radio"/>	<input type="radio"/>
14. Do you like doing things where you have to act quickly? .....	<input type="radio"/>	<input type="radio"/>
15. Do you worry about awful things that might happen? .....	<input type="radio"/>	<input type="radio"/>
16. Can you always keep every secret? .....	<input type="radio"/>	<input type="radio"/>
17. Can you get a party going? .....	<input type="radio"/>	<input type="radio"/>
18. Do you get thumping in your heart?.....	<input type="radio"/>	<input type="radio"/>
19. When you make new friends do you usually make the first move? .....	<input type="radio"/>	<input type="radio"/>
20. Have you ever told a lie?.....	<input type="radio"/>	<input type="radio"/>
21. Are you easily hurt when people find fault with you or the work you do?	<input type="radio"/>	<input type="radio"/>
22. Do you like telling jokes or funny stories to your friends? .....	<input type="radio"/>	<input type="radio"/>
23. Do you often feel tired for no good reason? .....	<input type="radio"/>	<input type="radio"/>
24. Do you always finish your homework before you play? .....	<input type="radio"/>	<input type="radio"/>
25. Are you usually happy and cheerful?.....	<input type="radio"/>	<input type="radio"/>
26. Are you touchy about some things? .....	<input type="radio"/>	<input type="radio"/>
27. Do you like mixing with other children?.....	<input type="radio"/>	<input type="radio"/>
28. Do you say your prayers every night? .....	<input type="radio"/>	<input type="radio"/>
29. Do you have "dizzy turns"? .....	<input type="radio"/>	<input type="radio"/>

- |  | YES                   | NO                    |
|--|-----------------------|-----------------------|
| 30. Do you like playing pranks on others? .....  | <input type="radio"/> | <input type="radio"/> |
| 31. Do you often feel fed-up? .....  | <input type="radio"/> | <input type="radio"/> |
| 32. Do you sometimes boast a little? .....   | <input type="radio"/> | <input type="radio"/> |
| 33. Are you mostly quiet when you are with others? .....   | <input type="radio"/> | <input type="radio"/> |
| 34. Do you sometimes get so restless that you cannot sit in a chair long?.....                     | <input type="radio"/> | <input type="radio"/> |
| 35. Do you often make up your mind to do things suddenly? .....                                    | <input type="radio"/> | <input type="radio"/> |
| 36. Are you always quiet in class, even when the teacher is out of the room?                       | <input type="radio"/> | <input type="radio"/> |
| 37. Do you have many frightening dreams? .....   | <input type="radio"/> | <input type="radio"/> |
| 38. Can you usually let yourself go and enjoy yourself at a gay party? .....                       | <input type="radio"/> | <input type="radio"/> |
| 39. Are your feelings rather easily hurt? .....  | <input type="radio"/> | <input type="radio"/> |
| 40. Have you ever said anything bad or nasty about anyone?.....                                    | <input type="radio"/> | <input type="radio"/> |
| 41. Would you call yourself happy-go-lucky?.....   | <input type="radio"/> | <input type="radio"/> |
| 42. Do you worry for a long while if you feel you have made a fool of yourself?                    | <input type="radio"/> | <input type="radio"/> |
| 43. Do you often like a rough and tumble game? .....   | <input type="radio"/> | <input type="radio"/> |
| 44. Do you always eat everything you are given at meals? .....                                     | <input type="radio"/> | <input type="radio"/> |
| 45. Do you find it very hard to take no for an answer? .....                                       | <input type="radio"/> | <input type="radio"/> |
| 46. Do you like going out a lot? .....   | <input type="radio"/> | <input type="radio"/> |
| 47. Do you sometimes feel life is just not worth living? .....                                     | <input type="radio"/> | <input type="radio"/> |
| 48. Have you ever been cheeky to your parents? .....   | <input type="radio"/> | <input type="radio"/> |
| 49. Do other people think of you as being very lively?.....  | <input type="radio"/> | <input type="radio"/> |
| 50. Does your mind often wander off when you are doing a job? .....                                | <input type="radio"/> | <input type="radio"/> |
| 51. Would you rather sit and watch than play at parties? .....                                     | <input type="radio"/> | <input type="radio"/> |
| 52. Do you find it hard to get to sleep at nights because you are worrying about things? .....     | <input type="radio"/> | <input type="radio"/> |
| 53. Do you usually feel fairly sure you can do the things you have to?.....                        | <input type="radio"/> | <input type="radio"/> |
| 54. Do you often feel lonely? .....  | <input type="radio"/> | <input type="radio"/> |
| 55. Are you shy of speaking first when you meet new people? .....                                  | <input type="radio"/> | <input type="radio"/> |
| 56. Do you often make up your mind when it is too late? .....                                      | <input type="radio"/> | <input type="radio"/> |
| 57. When children shout at you, do you shout back? .....   | <input type="radio"/> | <input type="radio"/> |
| 58. Do you sometimes feel specially cheerful and at other times sad without any good reason? ..... | <input type="radio"/> | <input type="radio"/> |
| 59. Do you find it hard to really enjoy yourself at a lively party?.....                           | <input type="radio"/> | <input type="radio"/> |
| 60. Do you often get into trouble because you do things without thinking first?                    | <input type="radio"/> | <input type="radio"/> |

**PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS**

# A P P E N D I X   $\bar{X}$

## MEANS AND STANDARD DEVIATIONS OF NEUROTICISM AND EXTRAVERSION BY AGE AND SEX AND THE SIGNIFICANCE OF THE DIFFERENCE OF THE MEANS FROM THE MEANS OF THE NORMS.

### NEUROTICISM - BOYS

NORM SAMPLE				THIS SAMPLE				
CA.	N	MEAN	S.D.	N	MEAN	S.D	CR <sub>t</sub> or	Significance
7	342	10.283	4.925	5	12.6	3.286	1.053	-
8	433	11.524	4.848	42	14.1	4.94	3.22	higher at .01
9	520	11.381	4.652	54	13.6	4.631	3.362	higher at .01
10	565	11.222	4.997	10	13.2	4.732	1.240	-
11	688	11.097	5.116	23	13.6	5.006	2.307	higher at .05

### NEUROTICISM - GIRLS

NORM SAMPLE				THIS SAMPLE				
CA	N	MEAN	S.D	N	MEAN	S.D	t	Significance
7	345	11.061	4.905	8	14.125	4.103	1.74	(-)
8	433	11.437	4.787	18	20.055	3.04	7.579	higher at .01
9	519	12.190	4.808	11	14.545	4.274	1.555	-
10	569	12.190	5.032	5	14.6	5.319	1.064	-
11	690	11.833	5.330	15	13.733	5.338	1.371	-
12	551	12.487	5.194	8	14.624	5.755	1.152	-

EXTRAVERSION - BOYS

NORM SAMPLE				THIS SAMPLE				CR t <sub>or</sub>	Significance
CA	N	MEAN	S.D.	N	MEAN	S.D			
7	342	15.833	3.344	5	15.8	4.086	0.486	-	
8	433	16.667	3.128	42	15.047	4.493	2.285	lower at .05	
9	520	17.050	3.414	54	16.278	4.566	1.892	-	
10	565	17.791	3.334	10	14.1	4.433	3.443	lower at .01	
11	688	17.693	3.479	23	14.13	5.48	4.712	lower at .01	

EXTRAVERSION - GIRLS

NORM SAMPLE				THIS SAMPLE				t	Significance
CA	N	MEAN	S.D	N	MEAN	S.D			
7	345	15.466	3.256	8	15.875	2.356	0.352	-	
8	433	16.078	3.276	18	15.888	2.805	0.242	-	
9	519	16.453	3.562	11	16.090	2.981	0.336	-	
10	569	16.808	3.175	5	15.4	1.516	1.060	-	
11	690	17.316	3.574	15	15.666	4.287	1.765	-	
12	551	17.354	3.514	8	16.875	2.850	0.383	-	

Norm sample data from EYSENCK 1965 pp.6 and 7.

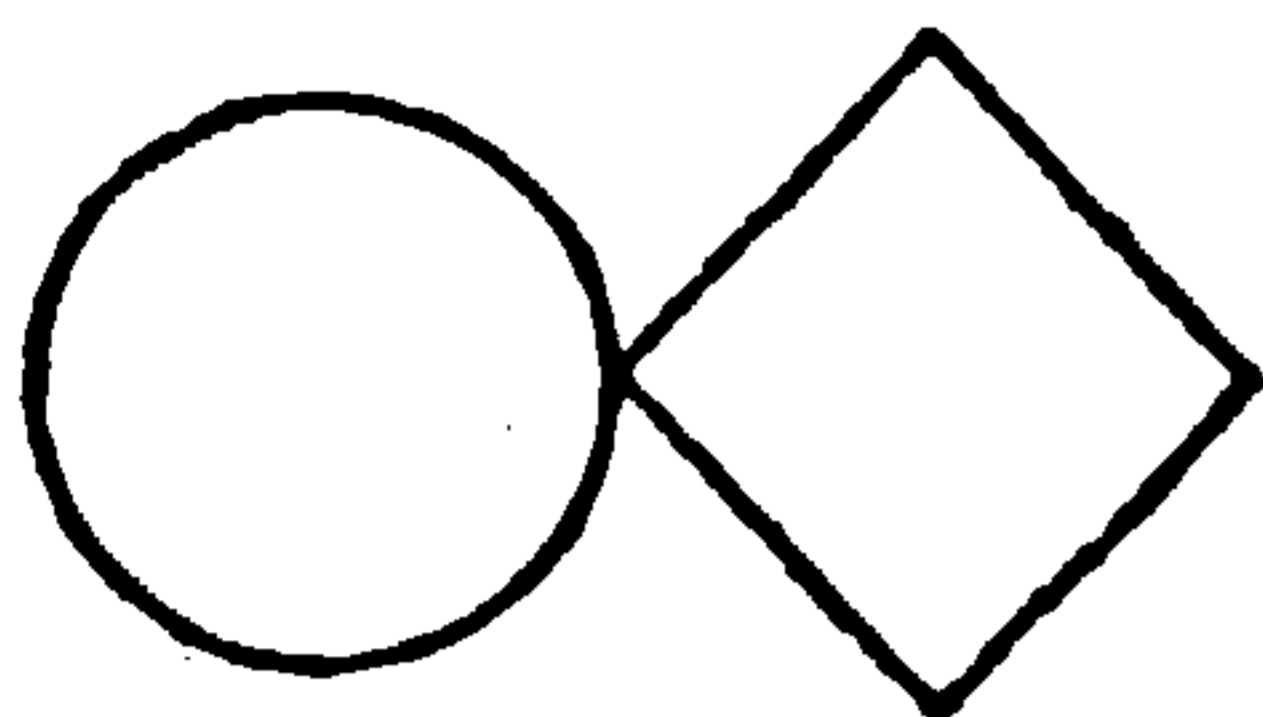
Critical ratios were used to test the significance of the difference between means where N is over 30. (from GARRETT 1966 pp. 213 to 217). Where N in the present sample is less than 30 formula 57 (GARRETT p. 224) was used that is

$$SD = \sqrt{\frac{\sum (X_1 - M_1)^2 + \sum (X_2 - M_2)^2}{(N_1 - 1) + (N_2 - 1)}}$$

Since  $\sigma^2 = \frac{\sum (X-M)^2}{N}$

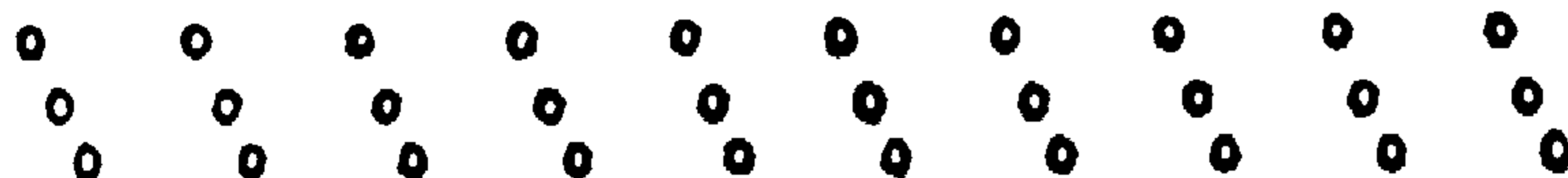
$N\sigma^2$  was substituted for  $\sum (X-M)^2$ ,  
and t was used.

THE BENDER FIGURES

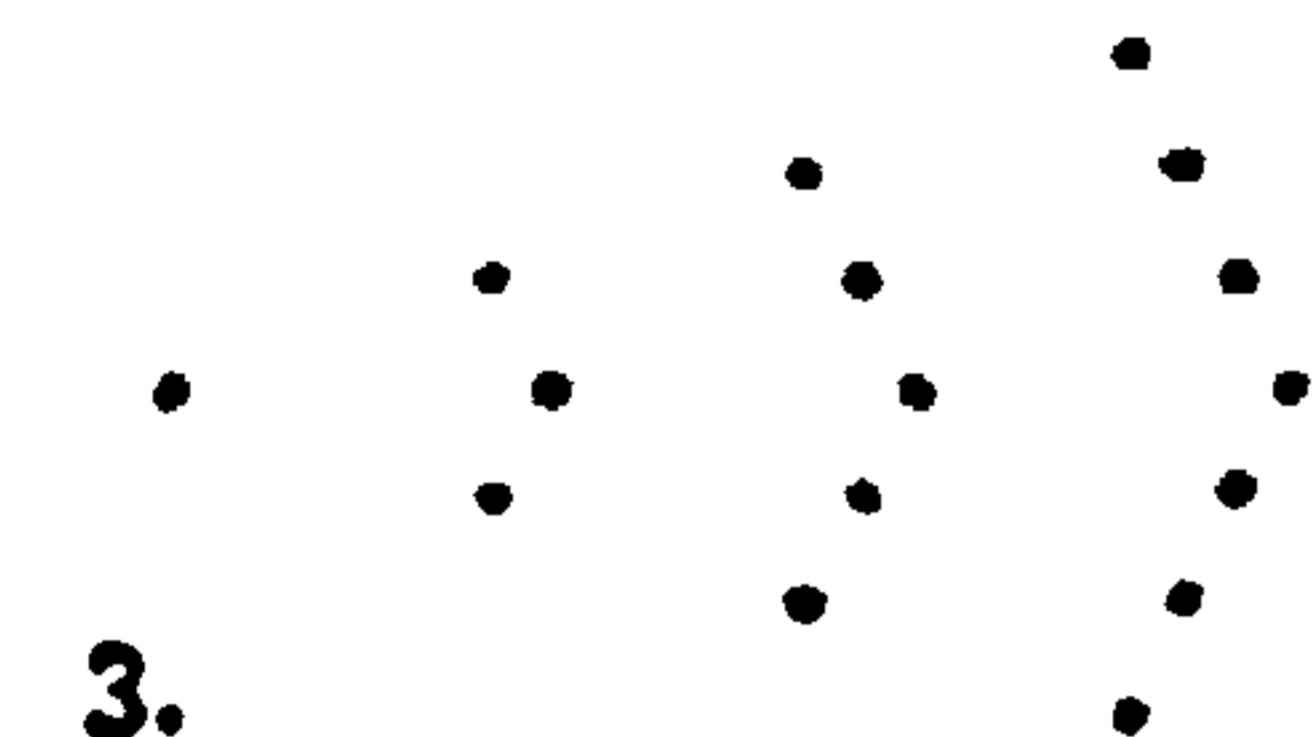


A.

1.

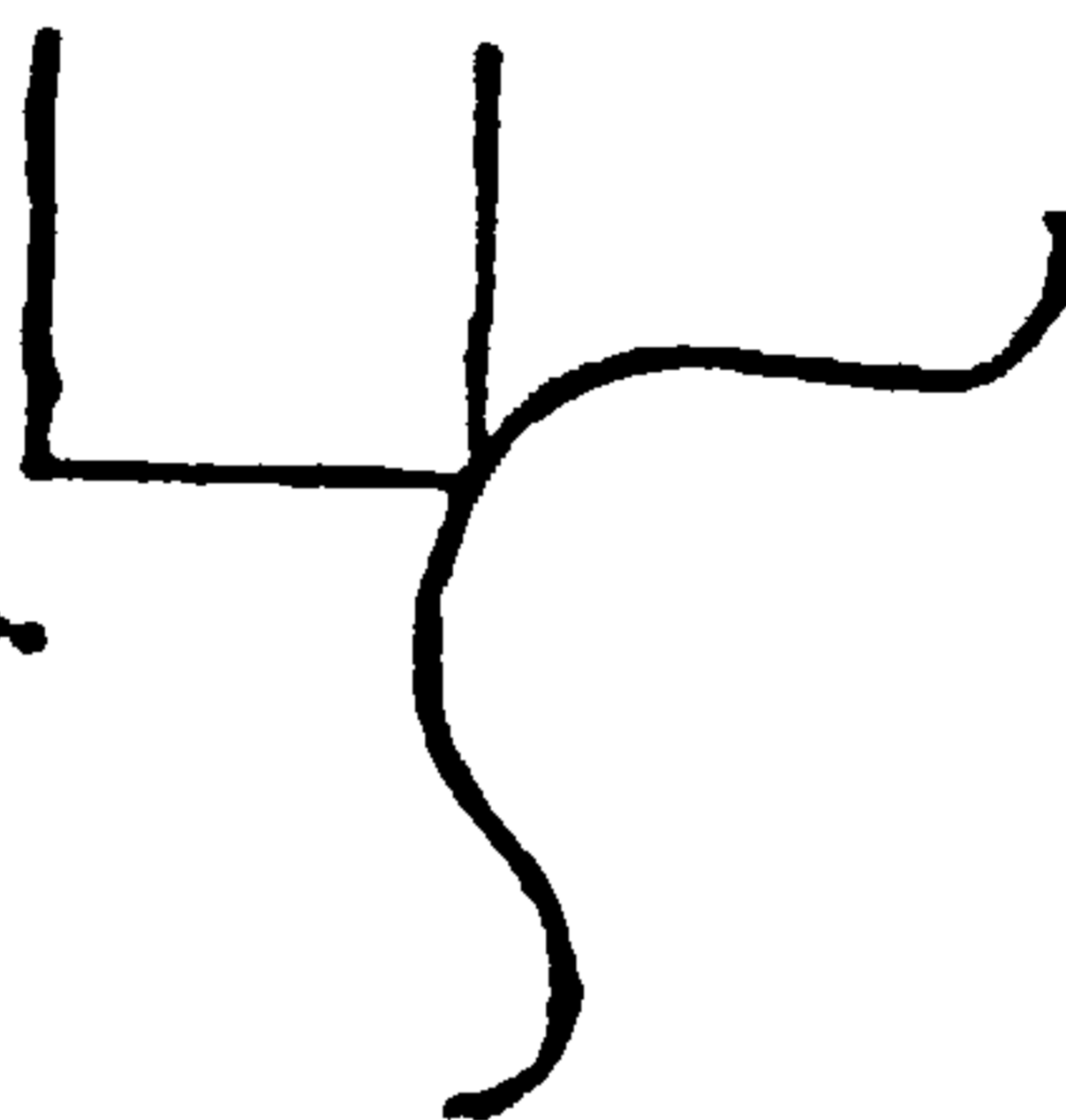


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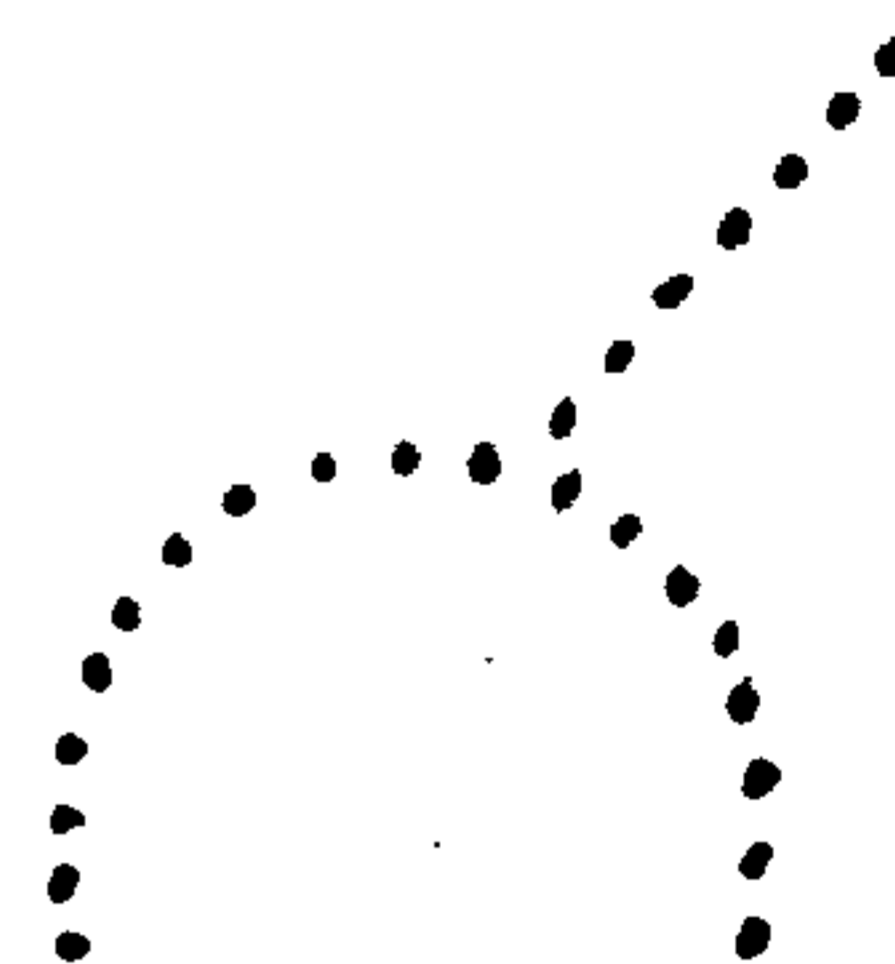


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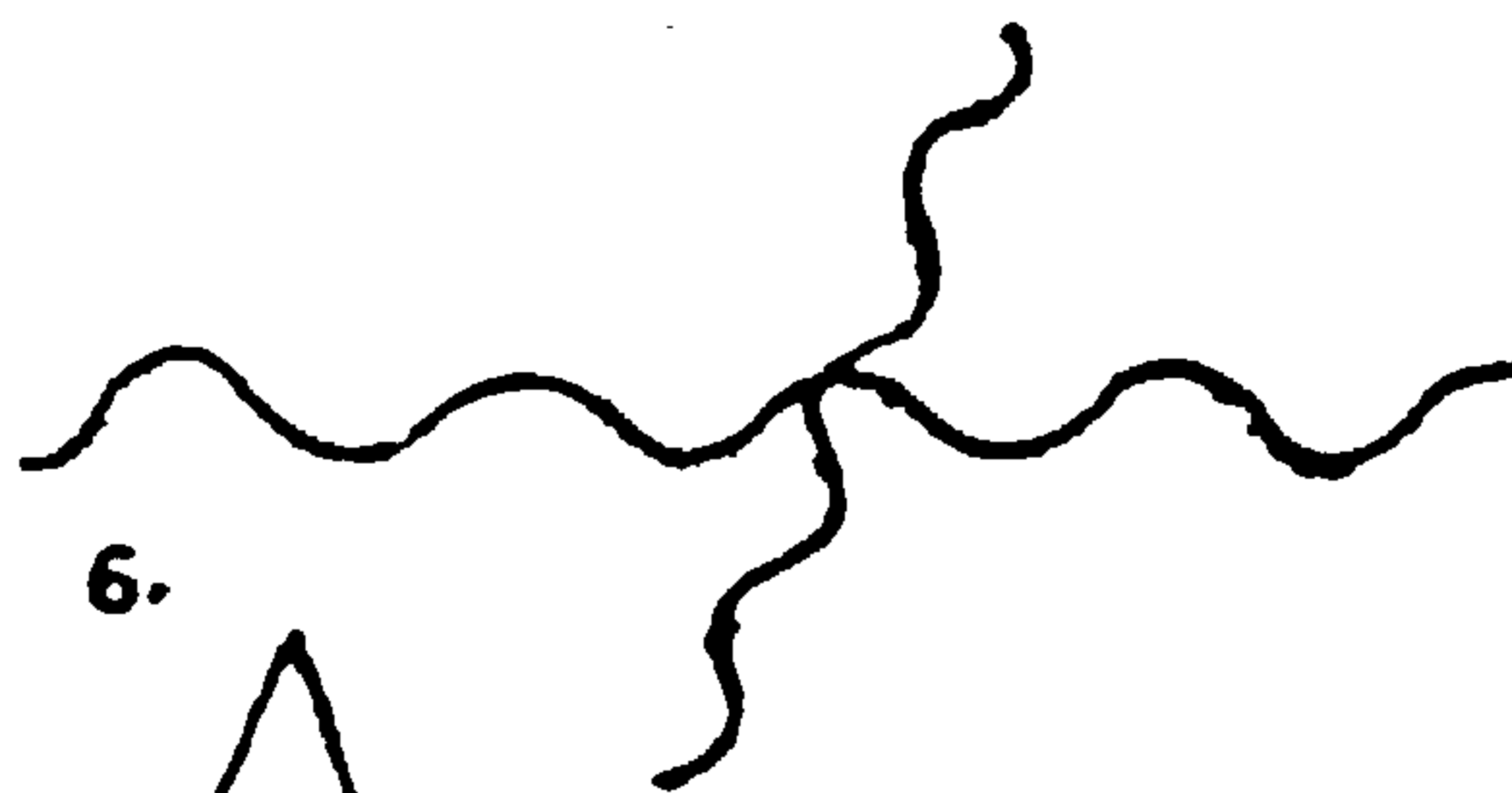
4.



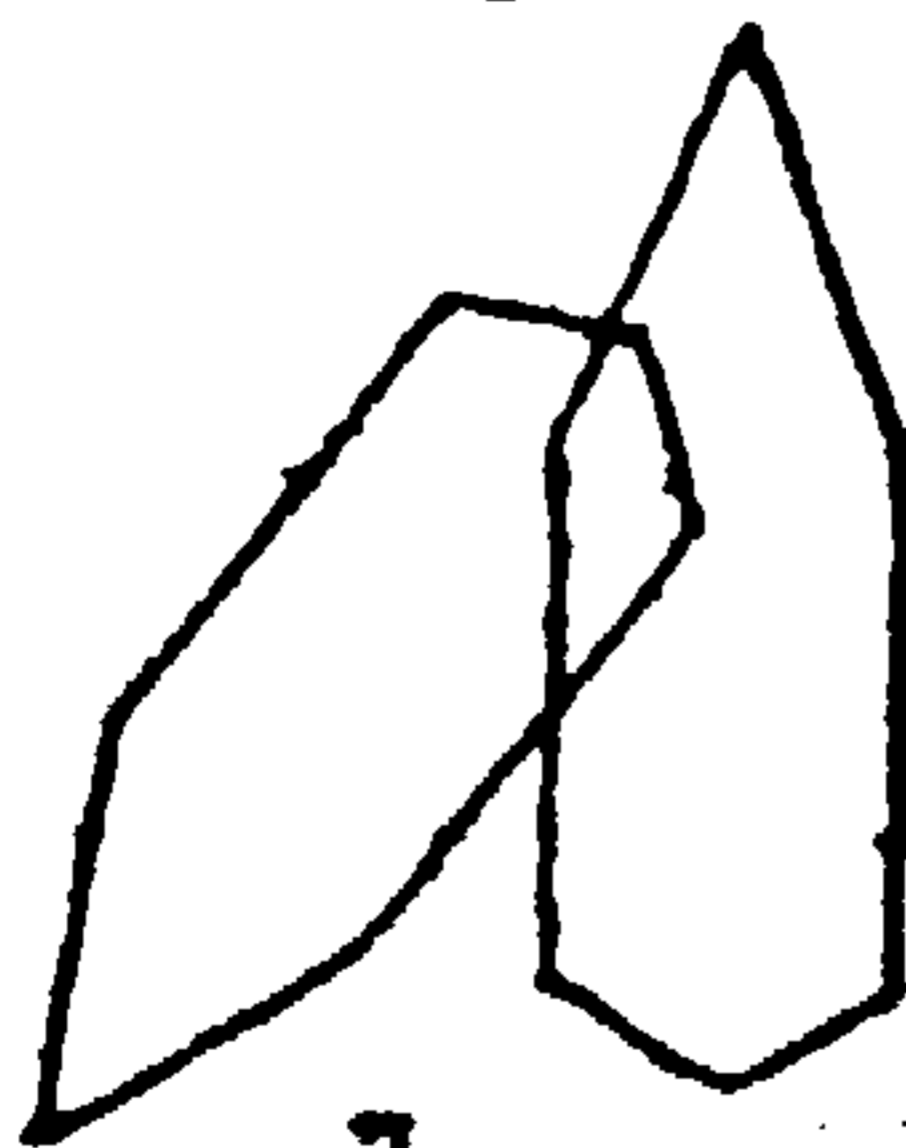
5.



6.



7.

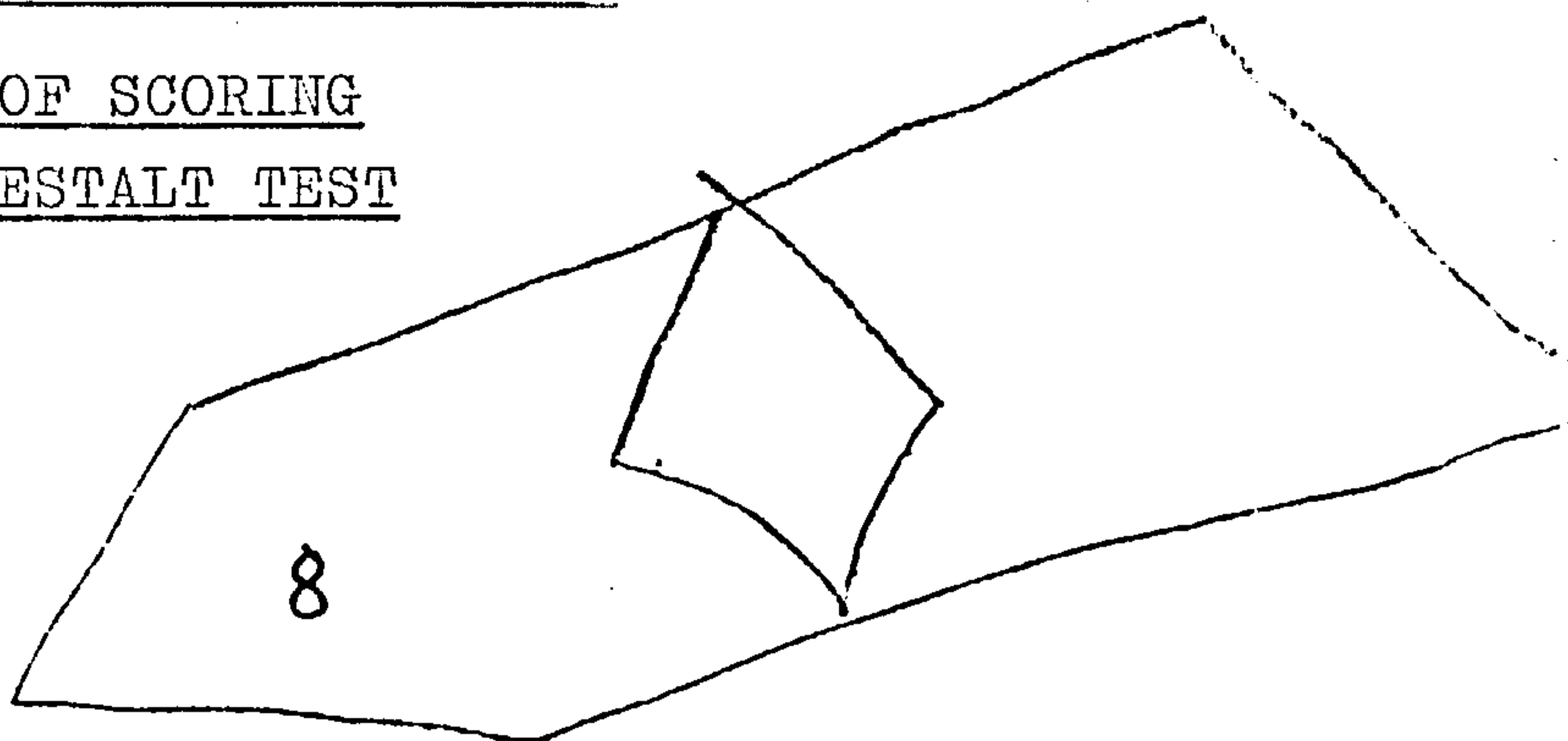


8.



A P P E N D I X XII

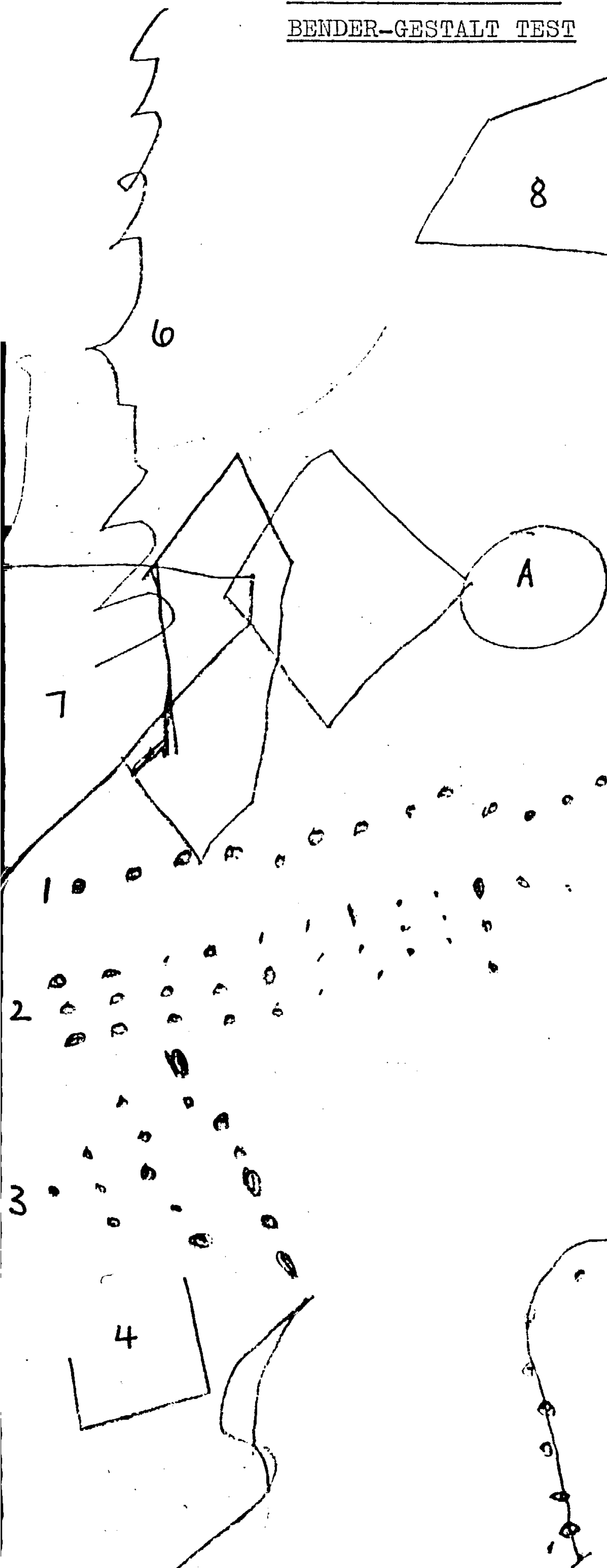
EXAMPLE OF SCORING  
BENDER-GESTALT TEST



- 1) —
- 2) —
- 3) 12a. integration
- 4) 13. Rotation \*\*
- 14. integration (flipped) \*\*
- 5) 17b integration (l. for) \*\*
- 6) 18a LS for curves \*
- 20. Perseveration \*\*
- 7) 21a disproportion \*
- 21b. extra + nos. LS
- 8) 24 Missing LS \*

Dev RS. = 9.  
Σ = 6 - 6 1/2

B.I. \* 4  
\*\* 3.



APPENDIX XIII

RECORD OF BENDER-GESTALT DEVELOPMENTAL DEVIATIONS FOR THE BRAIN-INJURED GROUP

Case No.	C.A.	Bender M.Devt. Age	1a	5*	6	7	8*	10	13*	16	18a	21a	21b	23	24
1	7.8	5.0	1a	5*	6	7	8*	10	13*	16	18a	21a	21b	23	24
2	10.6	5.0	2	3	5*	6*	8*	9	10	15	18a	21a	21b	24	
3	10.6	5.0	1a	1b	2	3	4	5*	7	8*	10	13*	16	21a	22
4	8.6	5 6/12	1a	3	5*	7	9*	11	14	17	21a	22	25*		
5	7.1	5.0	1a	1b	2	7	9*	11	13*	15	20	21a	21b	22	25*
6	8.9	5.0	4	5*	7	9	11	13*	14	15	18a	21a	22	24	25*
7	9.3	5 6/12	1b	5*	13*	11	15	16	17	18a	21a	24	25*		
8	8.0	5 6/12	1a	1b	3	5*	11	13*	15	16	21a	24	25*		
9	9.9	5.0	1a	3	6*	8*	10	11	16	17a	18a	20*	21	22	24
10	7.8	5.0	16	3	5*	8*	10	11	18a	19	21a	22	23	25*	
11	8.2	5.0	1a	1b	3	6*	9*	15	16	20*	21a	22	24	25*	
12	8.9	5 6/12	2	3	6*	7	9*	10	12a	15	21a	24	25*		

\* Highly significant brain-injury indicator.

APPENDIX XIII

RECORD OF BENDER-GESTALT DEVELOPMENTAL DEVIATIONS FOR THE BRAIN-INJURED GROUP (CONTD.)

Case No.	C.A.	Bender M. Devt. Age	1a	1b	2	5*	9*	10	13*	15	16	17a	20	21	22	23	24	25*
13	10.4	5.0	1a	1b	2	5*	9*	10	13*	15	16	17a	20	21	22	23	24	25*
14	9.7	5.0	4	5*	7	11	12a	14	15	16	20*	22	23	24	25*			
15	8.8	5.0	1a	2	4	6*	9*	10	16	17a	20*	23	24	25*				
16	6.5	5.0	1b	4	5*	6*	7	9*	11	13	16	20	24	25*				
17	8.0	5.0	1b	5*	8*	13*	20*	21a	22	23	24							
18	7.6	5 6/12	1b	3	4	5*	8*	10	14	16	23	24	25*					
19	10.1	5 6/12	1a	4	5*	9*	13*	14	20*	22	23	24						
20	8.0	6.0	12a	13*	14	17b*	18*	20*	21a	21b	24							
21	7.4	5.0	1a	1b	5*	8*	9*	10	11	13	16	23	24	25*				
22	8.3	5.0	1a	2	3	4	6*	8*	9*	10	12a	13*	14	15	18a	20*	21a	21b 23 24
23	9.3	5.0	1a	2	4	5*	8*	11	12a	13*	16	21a	21b	22	23	24		
24	8.1	5.0	1a	1b	3	6*	9*	11	12a	14	15	18	20*	21a	24	25*		

\*Highly significant brain-injury indicator.

RECORD OF BENDER-GESTALT DEVELOPMENTAL DEVIATIONS FOR THE BRAIN-INJURED GROUP (CONTD.)

**\* Highly significant brain-injury indicator.**

A P P E N D I X    XIV

A Questionnaire to Categorize Mothers'  
Attitudes Towards Their Children.

The following are statements derived from Social Histories taken over the last ten years. Please classify each into one of the following five categories:-

H	U	N	D	O
Hostile	Unconcerned	Normal	Demanding	Overanxious

in accordance with whichever of the five attitudes of a mother towards her child you think is represented in each statement.

You may think, for example, that a mother who tries to 'buy' her child's friendship displays an 'overanxious' attitude, if so score through 0 at the end of this statement.

Questions No. 66 to 82, & 112 to 118 inclusive and the last 2 questions deal not with the mother's attitude to the child, but with the mother's attitude towards the child's schooling. Please rate these questions therefore in that light i.e. such a statement as "mother believes the school staff discriminate against her child" should be rated not as the mother's attitude to the child but as the mother's attitude to the school. It would perhaps be wise to bracket of these questions first.

There may be instances where you feel that you cannot adequately categorize statements without a knowledge of the family background - "different categories for different circumstances or social classes. A large number of people will be rating these statements and it is hoped in this way to come to a modal categorization. It is sufficient to rate these statements for 6 to 12 year old children of everyday families living in the Glasgow area.

1. Mother gives more affection to this child than to his sibs. H.U.N.D.O.
2. Mother gives no affection to child. H.U.N.D.O.
3. Mother is unable 'to get through to child. H.U.N.D.O.
4. Mother does not approve of child going to record sessions/cafe etc. H.U.N.D.O.
5. Mother does approve of child going to record sessions/cafe etc. H.U.N.D.O.
6. "To give child a new blouse would spoil her". H.U.N.D.O.
7. Child is encouraged to bring friends to house. H.U.N.D.O.
8. Child is forbidden to bring friends to house. H.U.N.D.O.
9. Parents ignore any friends child might bring home. H.U.N.D.O.
10. Mother tries 'to buy' child's friendship. H.U.N.D.O.
11. All friends are 'vetted'. H.U.N.D.O.
12. Mother shouts at child when he is untidy. H.U.N.D.O.
13. Mother worried about how much pocket money she should give. H.U.N.D.O.
14. Mother does not say anything to child, in presence of other children, which might pull her own child down a peg in their eyes. H.U.N.D.O.
15. A belt/slipper is used to punish any serious misdemeanour, including wetting. H.U.N.D.O.
16. Parents refuse to give in to child when he shouts for something. H.U.N.D.O.
17. Parents put child to bed for shouting. H.U.N.D.O.
18. Child smacked for sexual indecencies e.g. exposure, genital play. H.U.N.D.O.
19. Child 'talked out of' or advised against such sexual indecencies. H.U.N.D.O.
20. Child is 'smacked out of' a temper tantrum. H.U.N.D.O.
21. Even though she knew child was wrong mother always takes child's side against others. H.U.N.D.O.
22. Parents unsure of using any kind of punishment. H.U.N.D.O.
23. Mother ignored child when he broke into conversation she was having. H.U.N.D.O.
24. Mother reminds child of his manners when he breaks into a conversation. H.U.N.D.O.

Hostile    Unconcerned    Normal    Demanding    Overanxious.

- |     |  |            |
|-----|--|------------|
| 25. | Mother smacks child when he breaks into her conversation.                                  | H.U.N.D.O. |
| 26. | Parents put child to bed for any misdemeanour.   | H.U.N.D.O. |
| 27. | Mother knows a lot about child's friends.  | H.U.N.D.O. |
| 28. | Mother thinks that child is often blamed for things others do.                             | H.U.N.D.O. |
| 29. | For many failings of the child, mother blames herself.                                     | H.U.N.D.O. |
| 30. | Parents shout so loudly, child is afraid.  | H.U.N.D.O. |
| 31. | Parents wish they had enough money to pack off child to boarding school to get some peace. | H.U.N.D.O. |
| 32. | Parents have no time at all for child.   | H.U.N.D.O. |
| 33. | Mother refers to child with such terms as "the pig".                                       | H.U.N.D.O. |
| 34. | Mother constantly complaining of inability to keep house in front of the child.            | H.U.N.D.O. |
| 35. | Mother uses open aggression eg. throws hammer at child during quarrel.                     | H.U.N.D.O. |
| 36. | Mother doesn't appear interested in child's delinquencies.                                 | H.U.N.D.O. |
| 37. | Mother does her best to stop child's delinquencies.  | H.U.N.D.O. |
| 38. | Mother would report child's delinquencies to authorities.                                  | H.U.N.D.O. |
| 39. | Mother 'babies' child.   | H.U.N.D.O. |
| 40. | Mother absorbed in self: only <u>her</u> feelings count.                                   | H.U.N.D.O. |
| 41. | Child is not given any pocket money.   | H.U.N.D.O. |
| 42. | Child is given adequate pocket money.  | H.U.N.D.O. |
| 43. | Child is given too much pocket money.  | H.U.N.D.O. |
| 44. | Mother bad tempered whenever wakened at night by child.                                    | H.U.N.D.O. |
| 45. | Child is given interminable no. of ice cream, sweets etc.                                  | H.U.N.D.O. |
| 46. | Child never or only very rarely given ice cream, sweets etc.                               | H.U.N.D.O. |
| 47. | Mother's sense of illness makes child morbid.  | H.U.N.D.O. |
| 48. | Mother tends only to the material needs of child.  | H.U.N.D.O. |
| 49. | Mother leaves under things behind - hotels she likes will not take them.                   | H.U.N.D.O. |
| 50. | Altho' she wants to, mother is unable to show her feelings towards her child.              | H.U.N.D.O. |

Hostile   Unconcerned   Normal   Demanding   Overanxious.

- |     |   |            |
|-----|---|------------|
| 51. | Child put out of house to give mother peace.  | H.U.N.D.O. |
| 52. | Child not allowed to go out of house because of bad company.  | H.U.N.D.O. |
| 53. | Mother can't bear to let child out of her sight.  | H.U.N.D.O. |
| 54. | Mother never takes a firm line about anything.  | H.U.N.D.O. |
| 55. | Mother gives less affection to this child than to his sibs.   | H.U.N.D.O. |
| 56. | Mother had stopped child's pocket money after stealing.   | H.U.N.D.O. |
| 57. | Mother does not give child any form of reward for doing well.   | H.U.N.D.O. |
| 58. | After chastising child for wrongdoing, mother is overcome with remorse.                                     | H.U.N.D.O. |
| 59. | Mother never misses the chance to take child down a peg.  | H.U.N.D.O. |
| 60. | Mother constantly praises child even when he has done nothing to merit it.                                  | H.U.N.D.O. |
| 61. | Mother harps on about any misdeed.  | H.U.N.D.O. |
| 62. | After punishment, mother never harps about misdeed.   | H.U.N.D.O. |
| 63. | Apparently child is never punished or chastised.  | H.U.N.D.O. |
| 64. | Without knowing the rights or wrongs of the situation parent thrashes child whenever a complaint is lodged. | H.U.N.D.O. |
| 65. | Child has possessions destroyed by angry parents.   | H.U.N.D.O. |
| 66. | Mother dreads a bad academic report from school.  | H.U.N.D.O. |
| 67. | Mother anxious to know psychological results of child.  | H.U.N.D.O. |
| 68. | Parent thinks attendance at Clinic would lead to missing too much school work.                              | H.U.N.D.O. |
| 69. | Parents insist child does more homework than the school gives him.  | H.U.N.D.O. |
| 70. | Mother is sympathetic to child's inability to do well in school.  | H.U.N.D.O. |
| 71. | Parents help child with his homework - when child needs help.   | H.U.N.D.O. |
| 72. | Mother constantly tries to teach things which child can't learn.  | H.U.N.D.O. |
| 73. | Mother angry with school because it has deprived child of games as a punishment.                            | H.U.N.D.O. |

Hostile Unconcerned Normal Demanding Overanxious.

- |      |   |            |
|------|---|------------|
| 74.  | Parents determined not to allow child into any school which may later detract from child's social advancement | H.U.N.D.O. |
| 75.  | Mother always says on failure that child will succeed next time.  | H.U.N.D.O. |
| 76.  | Mother wonders if child is finding home/school lessons too much of a burden.                                  | H.U.N.D.O. |
| 77.  | Mother is frightened to go near school as she might hear such a bad report.                                   | H.U.N.D.O. |
| 78.  | Mother would defend child against teacher if teacher punished unjustly.                                       | H.U.N.D.O. |
| 79.  | Mother does not know what subjects child is good at in school.  | H.U.N.D.O. |
| 80.  | Mother wants child to get a good education.   | H.U.N.D.O. |
| 81.  | Parents are anxious about poor staff pupil ratio in school.   | H.U.N.D.O. |
| 82.  | Parents don't think a poor staff-pupil ratio matters.   | H.U.N.D.O. |
| 83.  | Mother leaves money lying around and tells child not to touch it.   | H.U.N.D.O. |
| 84.  | Mother resents the fact that child wants to be out of the house a lot.  | H.U.N.D.O. |
| 85.  | Child must be quiet while mother watches T.V.   | H.U.N.D.O. |
| 86.  | Child is always being picked on by parent.  | H.U.N.D.O. |
| 87.  | Child is exhorted to make allowance for other faults.   | H.U.N.D.O. |
| 88.  | Mother is frightened of putting child into a bad temper.  | H.U.N.D.O. |
| 89.  | Mother deliberately 'needles' child.  | H.U.N.D.O. |
| 90.  | Parents have given up hope of getting child to do what they want.   | H.U.N.D.O. |
| 91.  | Mother understands and is sympathetic to child's deficiencies.  | H.U.N.D.O. |
| 92.  | Mother complies with child's demands to avoid 'scenes'.   | H.U.N.D.O. |
| 93.  | Mother upset by repetition of childish remarks and breaking things.   | H.U.N.D.O. |
| 94.  | Immediate obedience is expected.  | H.U.N.D.O. |
| 95.  | Mother is dogmatic and continually browbeats child.   | H.U.N.D.O. |
| 96.  | Mother is shocked when child shows spite against her.   | H.U.N.D.O. |
| 97.  | Mother always gets the last word.   | H.U.N.D.O. |
| 98.  | Mother prohibits child from getting dirty while playing.  | H.U.N.D.O. |
| 99.  | Child must do what he is told.  | H.U.N.D.O. |
| 100. | Mother shouts at child whenever she wants anything done.  | H.U.N.D.O. |

Hostile Unconcerned Normal Demanding Overanxious.

- |      |   |            |
|------|---|------------|
| 101. | Mother feels everything 'just happens'.<br>She can in no way control events.                                      | H.U.N.D.O. |
| 102. | Mother blames school for all child's<br>misdeeds.   | H.U.N.D.O. |
| 103. | Mother apprehensive about child's falling<br>foul of the law.   | H.U.N.D.O. |
| 104. | Mother does not care whether or not child<br>falls foul of the law.   | H.U.N.D.O. |
| 105. | Mother does not know what child does when<br>he leaves house.   | H.U.N.D.O. |
| 106. | Mother always knows what child does when<br>he leaves house.  | H.U.N.D.O. |
| 107. | Mother treats boy as if he were another<br>girl in family (vice versa).   | H.U.N.D.O. |
| 108. | Mother doesn't bother to tell clinic why<br>child is off.   | H.U.N.D.O. |
| 109. | Mother tells clinic why child is off.   | H.U.N.D.O. |
| 110. | Mother has only the vaguest idea of child's<br>friends.   | H.U.N.D.O. |
| 111. | Mother disapproves of child's friends.  | H.U.N.D.O. |
| 112. | Mother believes staff discriminate against<br>her child at school.  | H.U.N.D.O. |
| 113. | Mother says child will leave school at the<br>first opportunity tho' child wants to stay<br>on.                   | H.U.N.D.O. |
| 114. | Mother complains child is not given enough<br>to do in school.  | H.U.N.D.O. |
| 115. | Mother insists child continues at clinic<br>tho' school wants him to stop.  | H.U.N.D.O. |
| 116. | Child driven to tears over homework.  | H.U.N.D.O. |
| 117. | Child told he will be disgrace to family<br>etc if he 'fails' and goes to Junior<br>Secondary type school/course. | H.U.N.D.O. |
| 118. | Child told to try his best and get on<br>at school.   | H.U.N.D.O. |
| 119. | Mother makes no or little attempt to get<br>through to child.   | H.U.N.D.O. |
| 120. | Mother always 'puts her foot in it' when<br>dealing with the child.   | H.U.N.D.O. |
| 121. | Child only needs to raise his voice to<br>gain parents attention.   | H.U.N.D.O. |
| 122. | No pressure is put on child to make him<br>do what he is told to do.  | H.U.N.D.O. |
| 123. | Mother regularly blames others for child's<br>misdeeds.   | H.U.N.D.O. |
| 124. | Parents quarrel violently in front of child.  | H.U.N.D.O. |

Hostile Unconcerned Normal Demanding Overanxious

- |      |   |            |
|------|---|------------|
| 125. | Mother's expectations at home (making beds etc) too high for child.   | H.U.N.D.O. |
| 126. | Child is allowed to do what he wants, regardless of annoyance or damage.  | H.U.N.D.O. |
| 127. | Mother frequently tells child how well she did at school, games etc.  | H.U.N.D.O. |
| 128. | "You must be the best at everything you do".  | H.U.N.D.O. |
| 129. | "I expect you to do much better than that".   | H.U.N.D.O. |
| 130. | Mother and child do things together (wash dishes/make beds).  | H.U.N.D.O. |
| 131. | Mother goes shopping leaving under sixes playing in street.   | H.U.N.D.O. |
| 132. | Mother goes shopping leaving over sixes playing in the street.  | H.U.N.D.O. |
| 133. | Mother leaves children at home alone.   | H.U.N.D.O. |
| 134. | Child has to make his own meals when he comes home.   | H.U.N.D.O. |
| 135. | Child is never/rarely asked to tidy up.   | H.U.N.D.O. |
| 136. | Mother cannot stand child being untidy.   | H.U.N.D.O. |
| 137. | Mother cannot stand child being dirty.  | H.U.N.D.O. |
| 138. | Child allowed to eat with dirty hands.  | H.U.N.D.O. |
| 139. | Mother feels ill at ease when she doesn't know what child is doing.   | H.U.N.D.O. |
| 140. | "Looking after the children really demands too much of me".   | H.U.N.D.O. |
| 141. | Mother's attitude to school is such that she tells child she will defend him against anything teachers might do or say. | H.U.N.D.O. |
| 142. | Child has to give detailed account of his movements.  | H.U.N.D.O. |
| 143. | Without knowing rights or wrongs of a situation mother bawls out child whenever a complaint is lodged.                  | H.U.N.D.O. |
| 144. | Whenever a complaint is lodged against child mother does her best to find out the rights and wrongs.                    | H.U.N.D.O. |
| 145. | Mother never heeds complaints laid by non family members against child.   | H.U.N.D.O. |
| 146. | After chastising child for wrong doing mother makes it clear to him that she still loves him.                           | H.U.N.D.O. |

Hostile Unconcerned Normal Demanding Overanxious.

- |      |   |            |
|------|---|------------|
| 147. | After chastising child for wrong doing    | H.U.N.D.O. |
|      | mother withholds her love from the child. |            |
| 148. | Mother expects child to be independent    | H.U.N.D.O. |
|      | from 6 onwards.                           |            |
| 149. | Mother says all sibs should be given      | H.U.N.D.O. |
|      | equal attention.                          |            |
| 150. | Mother says sibs do not show even minor   | H.U.N.D.O. |
|      | rivalry.                                  |            |
| 151. | Mother threatens punishment will be       | H.U.N.D.O. |
|      | given by father when he comes home.       |            |
| 152. | Mother feels child relates better to      | H.U.N.D.O. |
|      | father than to mother.                    |            |
| 153. | Mother feels child relates better to      | H.U.N.D.O. |
|      | her than to father.                       |            |
| 154. | Mother asks regularly detailed questions  | H.U.N.D.O. |
|      | of how child did in school.               |            |
| 155. | Mother frequently compares her own or     | H.U.N.D.O. |
|      | father's excellent prowess at school      |            |
|      | with child.                               |            |

Hostile Unconcerned Normal Demanding Overanxious.

A P P E N D I X    XV

PATTERNS OF PARENTAL BEHAVIOUR

Inside are three hypothetical case histories. Each history is presented in terms of parents' behaviour towards a child. Seven descriptions of parental behaviour are defined. Assume that you are the social worker in charge of the case and that all you know of the behavioural pattern is what is contained herein. You are asked to try to fit each case into one of the seven defined behavioural patterns. Be sure to read each history to the end and do not make snap judgements on early information as later information might cause you to alter your opinion.

Please tick off in the appropriate box below whichever description you think is appropriate for a given history.

PARENTS BEHAVIOUR PATTERN	Shirley Ann Harper	Sam Duggan	John Bates
1. Actively and thoroughly rejecting			
2. Partially rejecting.			
3. Authoritarian but casual.			
4. Casual & indulgent.			
5. Accepting, indulgent, not democratic.			
6. Accepting, democratic - not indulgent.			
7. Accepting, democratic, indulgent.			

DEFINITIONS OF PATTERNS OF PARENTAL BEHAVIOUR

1. ACTIVELY AND THOROUGHLY REJECTING:- These parents are consistently hostile, unaffectionate, disapproving critical and distant. They seek actively to dominate the child by means of authoritarian demands. The home is full of tension and conflict, and there is a feeling of resentment on both sides. These parents dislike children, have little understanding of them, regard them as pests, and rule them in a dictatorial manner.

2. PARTIALLY REJECTING:- These parents are hostile and authoritarian only when a child becomes a nuisance. They have the same basic dislike for and indifference towards a child as those in the thoroughly rejecting group, but instead of continually nagging at him, they are merely indifferent to what he does, as long as he does not bother them. The home atmosphere is basically one of indifference, and the children have some degree of freedom. However, the parents solve conflicts of interest by laying down the law.

( 3 & 4 differ from 1 & 2 mainly in the absence of resentment and hostility, either chronically or in moments of stress).

3. AUTHORITARIAN BUT CASUAL:- These parents are authoritarian in what contacts with the children are necessary, but they do allow a good deal of freedom, not because they think freedom good for their offspring but because they know it is easier for themselves. They believe that a parent's authority is definitely above the desires of a child, but try to maintain a friendly atmosphere and they resort to commands on important matters, merely from expediency.

4. CASUAL AND INDULGENT:- These parents are mildly indulgent and in general tolerant but haphazard. They do not go out of their way to be indulgent, but they find that giving in is easier than resisting. They have no rigid standards for their children and have no fixed policy about handling them.

(Nos. 5, 6 and 7 are basically accepting parents who differ from each other in the degree of indulgence they permit, in the intensity of their desire to identify themselves with their children, and in the degree of democracy practised in the home).

5. ACCEPTING - INDULGENT NON DEMOCRATIC:- These parents are indulgent but not democratic. They show a deep emotional attachment to the child, they are unduly anxious about him, they protect and baby him, they identify themselves so completely with him that they try to live their own lives over in his; they put themselves to endless inconvenience to keep him happy. They do not however, admit him as an equal who helps them make decisions. They have definite standards for their childrens behaviour.

6. ACCEPTING - DEMOCRATIC - NON INDULGENT:- These parents are democratic but not indulgent. They accept their children but seem more to study them than to love them, although the parents are probably motivated by deep affection. Some parents of this type purposely repress expressions of affection and try to be objectively scientific. In their zeal to be democratic they are afraid of influencing him so that they often do not help him, even when he needs their aid to resolve a conflict. They make little or no effort to protect him from dangers of any kind. He is respected as an individual, encouraged to voice his opinions and his decisions are allowed to stand without adult coercion.

7. ACCEPTING - DEMOCRATIC - INDULGENT:- These parents encourage their children to be members of a family democracy, on a par with themselves. The children are allowed to criticize their parents, to express their own views, to make decisions on most minor and some major issues. They are also subject to a good deal of pressure that is applied indirectly through the close bond between parent and child. The home is child-centred, but it often rests upon a neurotic degree of contact between parent and child.

SHIRLEY ANN HARPER

A professional woman, married when she was 33 to a middle-aged salesman, Mrs Harper has become smug and proper. She is righteous and superior, she looks down on those she thinks of inferior class or of different standards, and her behaviour towards them is condemnatory rather than beneficent. Money, morals, and standards are her values.

Shirley Ann was a much desired child and her attractiveness and intelligence make her a social asset to her parents. When she was 2½ years they treated her with a succession of kisses, affectionate conversation and considerable handling.

Mrs Harper describes her daughter in such terms as "Shirley is our life". "She's my little sweetheart" or "At school she's really a teacher's little helper".

Of disciplinary situation Mrs Harper says "punishment just about breaks Shirley's little heart". At two years Mrs Harper let Shirley have the mail on condition she didn't tear the letters. When she did, the mother took them from her, and commiserated with her when she began to cry.

At three months Shirley was being broken of thumbsucking; at 10½ months Shirley imitated everything that her mother did - once inadvertently Mrs Harper forced air out of her lips, and Shirley did so too. At first the mother was amused, then she became worried saying she did not want Shirley to have the habit as it wasn't nice and proper.

Untidyness is forbidden and from the earliest age Shirley was restricted as to how many toys she could have out at a time and to rules about picking up one thing before going on to the next.

The properties which Mrs Harper attempts to din into the child vary from good manners at the table, including saying grace, to a subservient respect for her elders.

Their approval is intense and their punishment half-hearted and full of sympathy for "the poor little thing". Very few outsiders are permitted more than the most casual relationship with Shirley, all being found "bad for her" in one way or another - they are dirty, infectious, badmannered or contaminating in some other way.

A school was handpicked such as would exert the proper guidance on Shirley and set a high moral tone.

SAM DUGGAN:

Both parents are staid and conservative. In their struggles to get ahead both have had to work extremely hard in their small shop. They regard most recreation as a frivolous waste of time.

Mrs Duggan was probably termed shy as a girl. Now in her late twenties she appears cold, hostile and suspicious. Both are extremely religious and child bearing is looked upon as a duty. Thus Sam, who was born within a year of the marriage, was "accepted" even though neither parent had any fondness for children as such. The joys of parenthood were little recompense for the interruption he caused their work schedule.

Accounts of fondling Sam as a baby, or playing with him are rare. As a toddler he was dressed at the kitchen table, his mother holding him on her lap like a small baby and thrusting him into his clothes. It was too time consuming to allow any degree of self help. At the same period he was being given sharp slaps to teach him not to get into things.

The social worker reported of a visit to the home when Sam was seventeen months. "He saw my note book and made a dive at it. When he put his hand on it his mother said 'Don't do that'. He took my ankle in his hand and his mother told him not to do that. He went over to the couch and pulled at a cushion to which his mother said 'Now leave that alone' He came over to me and pulled at my pen and buttons. His mother pulled him away.

As he grew older he could be trusted more to conform and the following report made by the social worker when Sam was three was fairly typical of the mother-child interaction. "He had one period of giggling which lasted several minutes and was renewed with a rather forced note once or twice subsequently. His mother did not enter into his giggling, but on the other hand she made no attempt to stop him and waited until it dissappeared".

Sam's speech development was slow and after he did begin to talk his language was markedly distorted. Both parents could understand him but knew very few others could. It was as if once bare communication had been established, no matter how faulty, the parents felt their responsibility was at an end. One home visitor reported that over a period of two years, she never heard Mrs Duggan so much as ask Sam what had happened in school that day.

Arbitrary standards for conduct have been laid down, but so long as Sam conforms to those standards his behaviour is not too closely scrutinized - the parents have neither the time nor the interest. The independence this has fostered, plus a desperate seeking for affection and attention and demands for status of one sort or another, have made his school record one of near delinquency, although at home he is just conforming enough to escape the "problem" classification.

He has found the affection and status he misses at home by identifying with gangs, but there is no reason to suppose that a redirection of his behaviour into socially acceptable channels is not possible. However as far as Sam himself is concerned, help in the redirection of his energies will have to come from teachers or other interested adults - his parents are as imperceptive of his problems now as they were in their own behaviour which created the problems.

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JOHN BATES

From the earliest age John was taken along to parties, visits to relatives etc. and had no consistent schedule for meals or for sleeping. When he was 2½ years the family had been visiting and hadn't been put to bed till after midnight. The father remarked then that regular habits in a child turns him into a sissy.

Mrs Bates acts impulsively, meeting each situation as it arises according to what is most convenient or what she thinks at the moment is "the right thing to do". She herself is a genial, well adjusted person, easily aroused to affection and anger but not the type to "bear a grudge" after an emotional outburst. Once John pulled at the winder of the social worker's watch and his mother spanked him on the bottom and hands with a ruler. John kicked her, threw a cushion about and kicked the furniture for approximately five minutes before he regained his good humour. Only a few minutes after that Mrs Bates was tickling him affectionately and he was laughing uproariously.

John is given quite a bit of real freedom. The mother doesn't interfere with him in areas where she feels that his behaviour "doesn't make any difference". She does not expect him to get into mischief and she does not supervise his every action. He has a set amount of chores to do about the house and garden but when he does them, how and in what order are matters which he has insisted on deciding for himself, and his parents acquiesce.

Both parents enjoy John, and take him on outings. Mrs Bates at times gets thoroughly irritated by John, for instance during the period when he was adjusting to a new sibling she took the attitude that he was troublesome and mischievous. She handles most situations with matter of fact common sense but has little depth of insight.

JOHN BATES CONTD

John himself is a vigorous, spontaneous child, responsive and warm, possessed of considerable creative talent. In nursery school several traits were noticed which may relate to the pattern of parental behaviour. He was rebellious, almost uncontrollable at times. He had some mistrust and shyness about authority, wriggled out of things, was not direct or honest. Later school reports described him as a child who is unwilling to recognize discipline, is prone to test the limits to which he can misbehave, and see what he can get away with. It should be emphasized, however, that John's "problem behaviour" is well within the range of normality. It is more a matter of undisciplined exuberance than deeply motivated rebellion.



JUDGES' ORIGINAL CATEGORIZATION OF PARENTAL  
ATTITUDE AND CHECK BY THERAPISTS.

(Older Boys N = 60)

Case No	Judge	Check	Case No.	Judge	Check	Case No	Judge	Check
1	5	5	23	6	6	45	6	5
2	3	2	24	3		46	1	2
3	4		25	4	4	47	3	
4	1	1	26	7		48	3	3
5	5		27	5	5	49	2	
6	2	2	28	5		50	4	4
7	5	5	29	3	2	51	2	2
8	2		30	2		52	2	
9	2	3	31	2		53	2	
10	3	3	32	4	4	54	3	
11	7	6	33	3	3	55	7	
12	4	4	34	6		56	6	
13	6	7	35	3		57	3	2
14	2		36	1	1	58	4	4
15	2		37	7	7	59	2	
16	6		38	6		60	2	
17	7	7	39	3				
18	4	4	40	2				
19	2	2	41	2	2			
20	4	4	42	1				
21	5	5	43	1				
22	3		44	3				



JUDGES' ORIGINAL CATEGORIZATION OF PARENTAL  
ATTITUDE AND CHECK BY THERAPISTS

(Brain-injured Group N = 34)

<u>Case</u> <u>No.</u>	<u>Judge</u>	<u>Check</u>	<u>Case</u> <u>No.</u>	<u>Judge</u>	<u>Check</u>
1	6	6	18	5	5
2	5		19	2	2
3	5	5	20	5	5
4	5	6	21	1	
5	2		22	4	
6	2	2	23	3	3
7	3	3	24	2	2
8	2	2	25	2	
9	6		26	2	2
10	1	2	27	5	5
11	2		28	3	3
12	2		29	1	
13	7	6	30	3	3
14	6		31	5	
15	7	7	32	2	2
16	2		33	4	
17	2	3	34	1	

A P P E N D I X XV11DIVISION OF RAW DATA INTO ZONES

Throughout this appendix

- 1-2-3 reading, arithmetic = underachiever, normals and overachiever.
- 1-2-3 N = stable, low neurotic and high neurotic.
- 1-2-3 E = introvert, ambivert, and extravert.
- 1-0 Attit. = accepted, rejected.
- 1-0 M. = presence, absence of perinatal emotional stress.
- 1-0 D. = presence, absence of emotional disturbance in parent(s).

YOUNGER BOYS

Case No.	Rdg.	Arith.	Attit.	N.	E.	M.	D.
1	2 <sup>*</sup>	1	0	2	2	1	0
2	2	3	1	1	1	0	1
3	2	-	1	1	3	0	0
4	2	2	0	2	2	0	1
5	2	2	1	3	2	0	1
6	1	2	0	2	3	0	1
7	2	2	1	2	2	0	0
8	2	2	0	1	2	0	1
9	3	2	1	1	2	0	1
10	3	2	1	2	3	0	1
11	1	2	-	1	1	0	1
12	2	-	1	3	1	0	0
13	1	-	0	3	2	0	0
14	2	2	1	3	1	0	0
15	3	-	1	3	3	1	0

Case No.	Rdg.	Arith.	Attit.	N	E	M.	D.
16	2	-	0	3	1	1	1
17	2	-	1	3	1	0	0
18	2	1	0	2	1	0	1
19	1	2	1	1	2	0	1
20	2	2	0	3	3	0	1
21	2	-	0	2	3	0	0
22	2	-	0	2	2	1	1
23	2	2	1	2	1	0	1
24	2	2	0	3	1	0	0
25	1	1	0	2	1	0	1
26	2	-	1	2	1	1	1
27	2	-	0	3	2	0	1
28	3	2	1	1	3	0	0
29	3	2	0	2	2	1	1
30	3	-	1	3	2	1	1
31	1	1	0	2	2	0	1
32	2	2	0	1	2	0	0
33	2	1	1	3	2	0	1
34	1	2	0	1	3	0	1
35	2	-	0	3	1	1	1
36	2	-	1	2	1	0	0
37	2	-	0	1	3	0	0
38	2	-	1	3	1	0	0
39	3	2	1	3	3	1	1
40	3	2	1	3	2	1	0
41	1	-	0	3	1	0	0
42	2	1	1	3	1	1	1
43	3	-	0	3	2	0	1
44	3	2	1	1	2	1	0
45	2	2	0	1	2	0	0
46	3	3	1	1	2	0	0
47	1	-	0	2	2	0	0
48	1	1	0	1	2	0	0
49	2	-	1	2	3	1	1
50	1	2	1	1	1	1	0
51	3	3	1	3	3	0	1

Case No.	Rdg	Arith.	Attit.	N	E	M.	D.
51	3	3	1	3	3	0	1
52	2	-	1	3	3	1	1
53	3	-	1	3	2	1	0
54	3	3	1	1	3	0	1
55	3	-	1	3	3	1	1
56	2	2	1	2	3	0	0
57	1	-	1	2	3	0	1
58	2	-	1	2	3	1	1
59	3	1	0	2	1	1	1
60	3	3	1	3	1	1	0
61	1	-	0	1	1	1	1
62	2	-	0	3	1	1	0
63	1	2	0	1	2	1	1
64	1	1	0	1	1	0	0
65	2	-	1	2	3	1	1
66	1	1	1	1	1	1	0
67	2	2	1	2	3	0	1
68	2	3	1	3	3	0	0
69	1	-	1	1	3	0	1
70	2	3	1	2	2	0	1
71	2	2	0	1	2	1	0
72	3	3	0	3	2	0	1
73	2	2	1	2	1	0	1
74	2	-	1	2	3	0	1

OLDER BOYS

Case No.	Rdg	Arith.	Attit.	N	E	M	D
1	3	3	1	2	1	0	1
2	1	3	0	2	3	0	0
3	1	1	1	3	3	0	1
4	1	2	0	3	2	1	0
5	2	1	1	3	2	0	0
6	2	2	0	2	3	0	1
7	3	1	1	2	1	1	1
8	2	3	0	2	3	1	1
9	2	-	0	3	1	1	0
10	1	1	0	2	3	0	1

Case No.	Rdg.	Arith.	Attit.	N.	E.	M.	D.
11	3	2	1	3	1	0	1
12	2	2	1	3	2	0	1
13	3	3	1	1	1	1	1
14	2	-	0	1	2	1	1
15	3	2	0	1	2	0	0
16	2	-	1	1	2	1	0
17	1	2	1	1	2	0	0
18	1	1	1	1	3	0	0
19	2	2	0	3	3	1	0
20	2	1	1	3	1	0	0
21	3	2	1	1	2	1	1
22	1	3	0	3	2	0	0
23	2	1	1	2	2	0	1
24	2	3	0	1	3	0	1
25	2	-	1	2	3	0	1
26	2	2	1	3	3	0	1
27	2	-	1	2	1	0	1
28	1	1	1	2	3	1	1
29	1	2	0	2	3	1	1
30	1	-	0	2	2	0	0
31	2	-	0	2	1	1	1
32	1	2	1	2	2	0	0
33	3	2	0	2	1	0	0
34	2	1	1	2	1	1	1
35	1	2	0	2	3	0	1
36	2	1	0	3	3	1	0
37	1	1	1	3	2	0	1
38	2	2	1	3	3	0	0
39	3	1	0	3	1	1	1
40	1	2	0	1	2	1	1
41	2	2	0	3	3	1	1
42	3	2	0	1	3	1	1
43	1	-	0	1	2	0	0
44	3	-	0	1	1	1	0
45	2	-	1	2	1	0	1
46	2	2	0	3	1	0	1
47	2	-	0	1	1	0	1
48	2	-	0	3	1	0	0

Case No.	Rdg.	Arith.	Attit.	N.	E.	M.	D.
49	2	3	0	1	3	0	1
50	3	3	1	1	1	1	0
51	2	-	0	2	2	0	0
52	3	1	0	2	1	1	1
53	2	-	0	2	2	0	0
54	2	2	0	3	1	1	1
55	2	1	1	3	2	0	1
56	1	2	1	3	2	0	1
57	2	3	0	1	1	0	0
58	2	-	1	3	1	0	0
59	2	-	0	2	1	0	0
60	2	-	0	2	3	0	1

YOUNGER GIRLS

Case No.	Rdg.	Arith.	Attit.	N.	E.	M.	D.
1	3	-	1	3	3	1	0
2	1	2	0	3	3	1	1
3	2	2	0	1	2	0	0
4	1	-	0	1	1	1	1
5	1	2	0	1	2	1	1
6	3	-	1	2	1	0	0
7	3	-	1	2	3	0	0
8	2	1	0	3	3	1	1
9	1	2	0	3	1	1	0
10	2	-	0	1	1	0	0
11	3	3	1	3	2	1	0
12	3	2	1	3	2	1	0
13	2	3	1	3	2	1	1
14	1	2	0	2	2	0	0
15	3	3	1	3	1	0	1
16	2	3	1	3	2	0	0
17	2	-	1	3	2	1	0
18	1	1	0	1	3	1	0
19	2	2	0	2	1	0	1
20	1	1	0	1	2	1	1
21	1	3	0	2	1	0	0

Case No.	Rdg.	Arith.	Attit.	N.	E.	M.	D.
22	3	1	1	3	2	1	0
23	3	1	1	3	3	0	0
24	1	3	0	1	2	0	1
25	3	1	0	2	1	0	1
26	2	2	1	1	3	1	0
27	1	1	1	1	2	0	1
28	2	3	0	3	1	1	1
29	3	-	1	3	3	0	0
30	2	-	1	1	2	1	1
31	2	-	1	2	1	0	0

OLDER GIRLS

Case No.	Rdg.	Arith.	Attit.	N.	E.	M.	D.
1	2	-	1	3	1	1	1
2	2	1	0	1	3	0	0
3	2	2	0	3	1	0	1
4	3	2	1	2	2	0	1
5	2	3	1	2	2	0	1
6	1	1	1	2	2	0	1
7	2	2	0	3	2	1	0
8	1	3	0	3	2	0	0
9	1	1	0	1	2	0	0
10	3	3	0	1	2	1	1
11	2	-	1	2	1	1	0
12	2	2	1	1	3	0	0
13	3	1	1	3	3	1	1
14	3	2	0	3	1	0	0
15	3	-	1	1	1	1	1
16	2	3	1	3	2	0	0
17	3	-	0	2	1	0	0
18	3	2	0	2	1	1	0
19	1	1	0	3	3	1	1
20	3	-	0	1	1	1	1
21	2	2	1	3	1	1	1
22	2	2	0	2	3	1	1
23	1	1	0	2	1	1	1
24	1	1	0	1	1	1	1

Case No.	Rdg.	Arith.	Attit.	N.	E.	M.	D.
25	1	2	0	2	3	1	1
26	1	3	0	1	3	0	1
27	3	3	1	1	1	1	1
28	3	3	1	3	3	1	1
29	2	2	1	3	1	1	1
30	1	1	1	1	3	1	0
31	1	1	0	2	2	1	0
32	3	2	0	2	2	0	0
33	2	3	0	3	3	1	0
34	1	-	1	3	3	0	0

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BRAIN-INJURED BOYS AND GIRLS

Case No.	Rdg.	Attit.	N.*	E.**	M.	D.
1	2	1	-	+	1	0
2	2	1	-	-	1	1
3	1	1	-	-	0	0
4	1	1	-	-	0	0
5	2	0	-	-	1	0
6	1	0	-	-	0	1
7	2	0	+	-	0	1
8	2	0	+	+	0	0
9	1	1	+	+	0	1
10	3	0	-	-	0	0
11	2	0	-	+	0	0
12	1	0	-	-	1	0
13	1	1	-	+	0	1
14	1	1	+	-	0	0
15	2	1	-	+	0	0
16	2	0	-	+	0	1
17	2	0	+	-	0	0
18	3	1	-	-	0	0
19	2	0	+	+	1	0
20	3	1	-	+	1	1
21	2	0	+	+	0	0
22	2	1	+	-	0	0
23	2	0	+	+	1	1
24	3	0	+	+	1	0
25	3	0	-	-	1	0
26	1	0	+	-	0	0
27	3	1	+	+	1	1
28	3	0	-	-	0	0
29	2	0	+	-	1	1
30	3	0	+	+	0	1
31	1	1	-	+	0	0
32	3	0	-	-	0	1
33	1	1	-	-	0	1
34	2	0	-	-	0	0

\* +, - N = high, low neuroticism.

\*\* +, - E = extraversion, introversion.

A P P E N D I X    XV111CORRELATION AND REGRESSION ANALYSES FOR THE FIVE GROUPS.  
(READING AND ARITHMETIC).

This appendix contains data on all five groups:

Younger Boys      - reading, arithmetic;  
Older Boys        - reading, arithmetic;  
Younger Boys      - reading, arithmetic;  
Older Girls        - reading, arithmetic;  
Brain-injured boys and girls - reading.

The following data are presented for each group by subject:-

1. Mean, variance, standard deviation.
2. Correlation matrix.
3. Significance of correlations.
4. Analysis of variance.
5. Regression coefficients, 95% confidence limits (+ / -); standard errors; regression coefficients/S.E. and beta coefficients.
6.  $R^2$ , R.
7. S.E. Estimate
8. F - Ratio

YOUNGER BOYS (READING N = 74)SUMMARY OF THE INPUT

	MEAN	VARIANCE	S.D
Rdg.	8.02162	2.78035	1.66744
P. Attit.	.567568	.248797	.498795
C.A.	8.66892	.268473	.518144
I.Q.	104.405	218.272	14.7740
N.	13.7568	23.0907	4.80528
E.	15.6892	19.8336	4.45349
Perin. Distress	.351351	.231026	.480651
Parent. Disturb	.581081	.246760	.496750

CORRELATION MATRIX

	<u>Rdg</u>	<u>P.Attit</u>	<u>C.A.</u>	<u>I.Q.</u>	<u>N.</u>	<u>E.</u>	<u>Perin.</u>
P. Attit.	.253**	1.00					
C.A.	.100	.085	1.00				
I.Q.	.389***	-.102	-.108	1.00			
N.	.258*	.144	-.115	.062	1.00		
E.	.199*	.198	.104	.121	-.070	1.00	
Perin.	.178	.071	.176	-.281*	.026	-.140	1.00
Parent.	.081	-.022	.161	.049	.014	.114	.051

\* Significant at .05 level

\*\* " " .025 "

\*\*\* " " .005 "

ANALYSIS OF VARIANCE

	d.f	S.S	M.Sq.
REGRESSION	7	77.8863	11.1266
RESIDUAL	66	125.079	1.89513
TOTAL	73	202.965	2.78035

<u>REGR. COEFF.</u>	<u>95% CON.</u>	<u>S.E.</u>	<u>COEFF/S.E.</u>	<u>BETA</u>
-2.64580	6.32733	3.16765	-.8353	-
.717641	.677856	.339355	2.115	.2147
.283412	.650915	.325867	.8697	.0880
.053272	.023101	.011565	4.606	.4720
.072981	.068899	.034493	2.116	.2503
.054350	.076511	.038304	1.419	.1452
1.02141	.715497	.358199	2.852	.2944
.044227	.663424	.332130	.1332	.0131

$R^2 = .383742$        $R = .62$        $S.E. Est = 1.3$   
 $F - Ratio = 5.87115$        $(P < .01)$

OLDER BOYS (READING N = 60)SUMMARY OF THE INPUT

	MEAN	VARIANCE	S.D.
Rdg	9.90833	4.47976	2.11654
P.Attit.	.433333	.249718	.499717
C.A.	10.5000	.695593	.834022
I.Q.	108.083	231.434	15.2129
N.	13.7500	21.8178	4.67095
E.	14.9167	24.9251	4.99251
Perin.distress	.356667	.236158	.485961
Parent disturb	.583333	.247175	.497167

CORRELATION MATRIX

	Rdg	P.Attit.	C.A.	I.Q.	N.	E.	Perin.
P.Attit.	.079	1.00					
C.A.	.239*	-.248*(1)	1.00				
I.Q.	.664***	.162	.013	1.00			
N.	-.040	.091	-.024	-.025	1.00		
E.	-.315**(1)	-.114	-.112	.036	-.085	1.00	
Perin.	.134	-.177	.067	-.048	-.123	-.071	1.00
Parent.	.109	.125	-.020	.083	-.038	.068	.152

\* Significant at .05 level

\*\* Significant at .02 level

\*\*\* Significant at .005 level

(1) Two-tailed.

ANALYSIS OF VARIANCE

	d.f.	S.S	M.Sq.
REGRESSION	7	162.338	23.1912
RESIDUAL	52	101.968	1.96092
TOTAL	9	264.306	4.47976

<u>REGR. COEFF</u>	<u>95%CON</u>	<u>S.E.</u>	<u>COEFF/S.E.</u>	<u>BETA</u>
-3.33136	5.82591	2.90219	-1.148	-
-.015280	.799947	.398496	-0.383	-.00360
.473002	.458971	.228637	2.069	.1864
.093644	.024536	.012222	7.661	.6731
-.012872	.079527	.039616	-.3249	-.0284
-.134254	.075685	.037702	-3.561	-.3167
.512226	.787610	.392350	1.306	.1176
.257427	.759775	.378484	.6802	.0604

$R^2 = .614205$      $R = .78$      $S.E. Est \approx 1.3$   
 $F - RATIO = 11.8267 (P < .01)$

YOUNGER GIRLS (READING N = 31)SUMMARY OF THE INPUT

	MEAN	VARIANCE	S.D.
Rdg.	7.75484	.937226	.968104
P.Attit.	.516129	.258065	.508001
C.A.	8.38387	.407398	.638277
I.Q.	103.645	119.103	10.9134
N.	17.3226	23.6258	4.86064
E.	15.9677	6.23226	2.49645
Perin distress.	.516129	.258065	.508001
Parent disturb.	.419355	.251613	.501610

CORRELATION MATRIX

	Rdg.	P.Attit.	C.A.	I.Q.	N.	E.	Perin.
P.Attit.	.212	1.00					
C.A.	.494	.149	1.00				
I.Q.	.098	-.387*	-.369*	1.00			
N.	.333	.403*	.099	-.305	1.00		
E.	.159	.198	.071	.039	.048	1.00	
Perin.	-.242	.096	.026	-.044	.011	.145	
Parent.	-.172	-.485**	-.114	.418*	-.139	-.202	.169

\* Significant at .05 level

\*\* Significant at .01 level

ANALYSIS OF VARIANCE

	d.f.	S.S.	M.Sq.
REGRESSION	7	16.8835	2.41193
RESIDUAL	23	11.2332	.488401
TOTAL	30	28.1168	.937226

<u>REGR. COEFF.</u>	<u>95%CON</u>	<u>S.E.</u>	<u>COEFF/S.E</u>	<u>BETA</u>
-6.52015	5.85109	2.82822	-2.305	-
.199606	.667778	.322782	.6184	.1047
.946438	.448439	.216761	4.366	.6240
.048255	.030574	.014779	3.265	.5440
.073604	.060962	.092467	2.498	.3696
.020526	.112901	.054573	.3761	.0529
-.432591	.551630	.266640	-1.622	-.2270
-.342764	.674437	.326001	-1.051	-.1776

$R^2 = .600478$        $R = .77$        $S.E. Est = .62$   
 $F - RATIO = 4.9382$  ( $P < .01$ )

OLDER GIRLS ( READING N = 34)SUMMARY OF THE INPUT.

	MEAN	VARIANCE	S.D.
Rdg	10.2529	3.13469	1.77051
P.Attit.	.441176	.254011	.503995
C.A.	11.2176	.837255	.915016
I.Q.	100.529	191.226	13.8285
N.	14.2647	24.4430	4.94398
E.	16.5294	24.1961	4.91895
Perin distress	.588235	.249554	.499554
Parent disturb.	.529412	.256684	.506640

CORRELATION MATRIX

	Rdg	P.Attit.	C.A.	I.Q.	N	E	Perin
P.Attit.	.061	1.00					
C.A.	.263	-.09	1.00				
I.Q.	.636**	.005	-.152	1.00			
N.	-.024	.098	-.111	-.012	1.00		
E.	.077	.172	-.161	.403*	.053	1.00	
Perin	.276	.021	.394*	.094	-.126	.042	1.00
Parent	-.005	.244	-.099	.002	-.239	-.006	.289

\* Significant at .05 level

\*\* Significant at .01 level

ANALYSIS OF VARIANCE

	d.f	S.S	S.Sq
REGRESSION	7	60.3732	8.62474
RESIDUAL	26	43.0714	1.65659
TOTAL	33	103.445	3.13469

<u>REGR. COEFF</u>	<u>95%CON</u>	<u>S.E.</u>	<u>COEFF/SE.</u>	<u>BETA</u>
-5.68602	8.31111	4.04280	-1.406	-
.431767	.973710	.473645	.9116	.1229
.617073	.588179	.286110	2.157	.3189
.097039	.037113	.018053	5.375	.7579
.009372	.0982112	.047773	.1962	.0262
-.073539	.105128	.051138	-1.438	-.2043
.336289	1.09759	.533905	.6299	.0949
-.084852	1.05128	.511379	-.1659	-.0243

$R^2 = .583628$ ,  $R = .76$ ,  $S.E. Est. = 1.2$   
 $F - RATIO = 5.20631$  (  $P < .01$  )

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YOUNGER BOYS (ARITH N = 44)SUMMARY OF THE INPUT.

	MEAN	VARIANCE	S.D.
Arith	7.20909	3.17154	1.78088
P.Attit.	.545455	.253700	.503686
C.A.	8.68864	.265682	.515443
I.Q	108.682	202.966	14.2466
N.	12.6591	22.4625	4.73946
E.	15.7955	15.3293	3.91526
Perin distress	.250000	.191860	.438019
Parent disturb.	.590909	.247357	.497350

CORRELATION MATRIX

	Arith	P.Attit	C.A.	I.Q.	N.	E.	Perinatal
P.Attit.	.261*	1.00					
C.A.	.376**	.016	1.00				
I.Q.	.427***	-.024	-.157	1.00			
N.	.092	.177	-.045	.259*	1.00		
E.	.199	.177	-.035	.195	.005	1.00	
Perinatal	-.194	-.000	.106	-.315*	-.160	-.132	1.00
Parental.	-.148	-.110	-.073	.089	.196	.135	-.267

\* Significant at .05 level.

\*\* Significant at .01 level.

\*\*\* Significant at .005 level.

ANALYSIS OF VARIANCE

	d.f.	S.S.	S.Sq
REGRESSION	7	68.0048	9.71497
RESIDUAL	36	68.3714	1.89921
TOTAL	43	136.376	3.17154

<u>REGR. COEFF</u>	<u>95%CON.</u>	<u>S.E.</u>	<u>COEFF/SE.</u>	<u>BETA</u>
-13.0974	8.63636	4.25731	-3.076	.-
.855165	.883128	.435340	1.964	.2419
1.54852	.839923	.414041	3.740	.4482
.058362	.033302	.016416	3.555	.4669
-.014879	.097520	.048073	-.3095	-.0396
.046203	.113670	.056034	.8246	.1016
-.540196	1.06354	.524274	-1.030	-.1329
-.615757	.921873	.454439	-1.355	-.1720

$R^2 = .498655$        $R = .71$        $S.E. Est = 1.3$   
 $F - RATIO = 5.11528$        $(P < .01)$

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OLDER BOYS (ARITHMETIC N = 42)SUMMARY OF THE INPUT

	MEAN	VARIANCE	S.D.
Arith	8.59286	3.82361	1.95540
P.Attit.	.500000	.256098	.506061
C.A.	10.4024	.671458	.819425
I.Q.	109.881	232.937	15.2623
N.	13.9524	25.4611	5.0490
E.	15.3810	23.3147	4.82853
Perin distress	.380952	.241580	.491507
Parent disturb.	.666667	.227642	.477119

CORRELATION MATRIX

	Arith	P.Attit.	C.A.	I.Q.	N.	E.	Perin.
P.Attit.	-.216	1.00					
C.A.	.083	-.162	1.00				
I.Q.	.472*	.131	.109	1.00			
N.	-.255	.096	.016	.027	1.00		
E.	.010	-.089	-.082	-.006	-.112	1.00	
Perin.	.003	-.196	.173	.061	-.209	-.135	1.00
Parent.	.046	-.000	.108	.075	.074	.046	.242

\* Significant at .005 level

ANALYSIS OF VARIANCE

	d.f	S.S	M.Sq.
REGRESSION	7	60.6326	8.66180
RESIDUAL	34	96.1352	2.82751
TOTAL	41	156.768	3.82361

<u>REGR. COEFF.</u>	<u>95%CON</u>	<u>S.E.</u>	<u>COEFF/S.E.</u>	<u>BETA</u>
3.90588	8.08206	3.97602	.9824	-
-1.14809	1.11234	.547223	-.2038	-.2971
-.001560	.677100	.333103	-.0046	-.0006
.067285	.035752	.017588	3.826	.5252
-.112313	.110690	.054454	-2.063	-.2898
-.029187	.114550	.056353	-.5179	-.0720
-.684391	1.20753	.594054	-1.152	-.1720
.240751	1.17586	.578473	.4162	.0587

$R^2 = .386767$      $R = .62$      $S.E. Est = 1.5$   
 $F - RATIO = 3.06341$      $(P < .05)$

YOUNGER GIRLS (ARITHMETIC N = 22)SUMMARY OF THE INPUT.

	MEAN	VARIANCE	S.D.
Arith	6.30455	.791883	.889878
P.Attit.	.409091	.253247	.503236
C.A.	8.45455	.414026	.643448
I.Q.	103.636	161.481	12.7075
N.	17.5909	26.1580	5.11449
E.	16.1818	5.87013	2.42284
Perin distress	.545455	.259740	.509647
Parent disturb.	.500000	.261905	.511766

CORRELATION MATRIX

	Arith	P.Attit.	C.A.	I.Q.	N.	E.	Perin.
P.Attit.	-.238	1.00					
C.A.	.279	.193	1.00				
I.Q.	.407*	-.422	-.388	1.00			
N.	-.053	.364*	-.113	-.285	1.00		
E.	-.367	.209	-.059	.061	-.101	1.00	
Perin.	-.321	.203	-.022	-.019	.017	.186	1.00
Parent.	.235	-.462*	-.058	.476*	-.045	-.192	-.00

\* Significant at .05 level.

ANALYSIS OF VARIANCE

	d.f	S.S.	M.Sq.
REGRESSION	7	10.4913	1.49876
RESIDUAL	14	6.13821	.438443
TOTAL	21	16.6295	.791883

<u>REGR. COEFF</u>	<u>95% CON</u>	<u>S.E.</u>	<u>COEFF/S.E</u>	<u>BETA</u>
-4.31333	7.71454	3.59700	-1.199	-
-.138619	.822247	.383384	-.3616	-.0784
.803825	.564780	.263336	3.052	.5812
.053759	.033329	.015540	3.459	.7677
.038498	.072452	.033782	1.140	.2213
-.123566	.138075	.64379	-1.919	-.3364
-.380784	.635863	.296480	-1.284	-.2181
-.325626	.786315	.366630	-.8882	-.1873

$R^2 = .630883$      $R = .79$      $S.E. Est = .55$   
 $F - RATIO = 3.41836$      $(P < .05)$

OLDER GIRLS (ARITH. N = 28)SUMMARY OF THE INPUT.

	MEAN	VARIANCE	S.D.
Arith.	9.00357	2.55147	1.59733
P.Attit.	.392857	.247354	.497347
C.A.	11.2214	.865450	.930296
I.Q.	100.321	198.300	14.0819
N.	13.8929	25.1362	5.01361
E.	16.0357	13.2950	3.64623
Perin distress	.928571	4.14286	2.03540
Parent disturb.	.571429	.253968	.503953

CORRELATION MATRIX

	<u>Arith</u>	<u>P.Attit</u>	<u>C.A.</u>	<u>I.Q.</u>	<u>N</u>	<u>E</u>	<u>Perinatal</u>
P.Attit.	.124	1.00					
C.A.	.392**	-.067	1.00				
I.Q.	.475***	-.088	-.041	1.00			
N.	-.009	.122	-.135	-.055	1.00		
E.	.272	.135	.056	.239	-.158	1.00	
Perinatal	.221	-.154	.277	-.074	-.092	.330	1.00
Parental	.011	.253	-.011	-.110	-.151	-.153	.222

\* Significant at .05 level.

\*\* Significant at .025 level.

\*\*\* Significant at .01 level.

ANALYSIS OF VARIANCE

	d.f	S.S.	M.Sq.
REGRESSION	7	32.5111	4.64444
RESIDUAL	20	36.3784	1.81892
TOTAL	27	68.8896	2.55147

<u>REGR. COEFF.</u>	<u>95%CON</u>	<u>S.E.</u>	<u>COEFF/SE</u>	<u>BETA</u>
-5.33400	8.90546	4.26909	-1.249	
.657673	1.25702	.602589	1.091	.2048
.661541	.615288	.294956	2.243	.3853
.058079	.040742	.019531	2.974	.5120
.022459	.115200	.055224	.4067	.0705
.243036	.183393	.087915	.2764	.0555
.134930	.331826	.159070	.8482	.1719
.0035103	1.26946	.608554	.0058	.0011

$R^2 = .471930$      $R = .69$      $S.E. \text{ Est.} = 1.2.$   
 $F - \text{RATIO} = 2.55341$      $(P < .05)$

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BRAIN INJURED CHILDREN (N = 34)SUMMARY OF THE INPUT.

	MEAN	VARIANCE	S.D.
Rdg.	7.59118	3.25113	1.80309
P.Attit.	.411765	.249554	.499554
C.A.	8.86765	1.55316	1.24626
I.Q.	97.9118	175.719	13.2559
N.	16.8529	19.6444	4.43220
E.	15.4706	17.6506	4.20126
Perin distress	.323529	.249554	.474858
Parent disturb.	.411765	.249554	.499554

CORRELATION MATRIX

	<u>Rdg</u>	<u>P.Attit.</u>	<u>C.A.</u>	<u>I.Q.</u>	<u>N.</u>	<u>E.</u>	<u>Perin</u>
P.Attit.	-.225	1.00					
C.A.	.243	.299	1.00				
I.Q.	.235	-.301	-.190	1.00			
N.	.038	.001	.04	-.155	1.00		
E.	-.01	.266	-.083	.05	.298	1.00	
Perinatal	.375*	-.068	.249	-.178	.153	-.246	1.00
Parental.	.061	.150	.124	-.168	-.081	-.196	.06

\* Significant at .05 level.

ANALYSIS OF VARIANCE

	d.f.	S.S.	M.Sq
REGRESSION	7	37.0185	5.28835
RESIDUAL	26	70.2689	2.70265
TOTAL	33	107.288	3.25113

<u>REGR. COEFF.</u>	<u>95%CON.</u>	<u>S.E.</u>	<u>COEFF/SE.</u>	<u>BETA</u>
-1.15397	7.60154	3.69764	-.3121	
-.983955	1.39509	.678619	-1.450	-.2726
.412565	.520629	.253251	1.629	.2852
.03825	.048911	.023792	1.608	.2812
-.015779	.146599	.071311	-.2213	-.0388
.087292	.166716	.081096	1.076	.2034
1.45836	1.36686	.664885	2.193	.3841
.461219	1.23700	.601719	.7665	.1278

$R^2 = .345040$ ,  $R = .59$  S.E. Est = 1.5.  
F - RATIO = 1.95673 (N.S.)

---

A P P E N D I X    XIX

ZONE ANALYSIS TABLES.

The following key is for terms used here:-

A    = Accepted  
 Amb = Ambiverts  
 D    = Parental emotional disturbance  
 HA   = High achiever  
 M    = Perinatal emotional maternal distress  
 Nor = Normals  
 R    = Rejected  
 S    = Stable  
 UA   = Underachievers

(1)

	UA	Nor	HA	
A	5 (9.7)	23 (22.1)	14 (10.2)	42
R	12(7.4)	16 (16.7)	4 ( 7.8)	32
	17	39	18	74 = N
	$\chi^2 = 8.48$			

(2)

	UA	Nor	HA	
A	7 (6.9)	13 (14.7)	6(4.3)	26
R	9 (9.1)	19 (19.3)	6(5.7)	34
	16	32	12	60 = N
	$\chi^2 = 1.496$			

(3)

	UA	HA	
A	4	12	16
R	11.5	3.5	15
	15.5	15.5	31 = N
	$\chi^2 = 6.329$		

(4)

	UA	HA	
A	6.5	8.5	15
R	10.5	8.5	19
	17	17	34 = N
	$\chi^2 = 0.11$		

(5)

	S	Lon	HiN	
UA	10(5)	5(5.7)	2(6.2)	17
Nor	7(11.5)	17(13.2)	15(14.2)	39
HA	5(5.3)	3(6)	10(6.5)	18
	22	25	27	74 = N
	$\chi^2 = 14.2$			

(6)

	S	LoN	HiN	
UA	7(8.5)	13(12.2)	12(11.2)	32
HA	9(7.5)	10(10.7)	9( 9.8)	28
	16	23	21	60 = N
	$\chi^2 = 0.4$			

(7)

	S	HiN	
UA	9.5	6	15.5
HA	4	11.5	15.5
	13.5	17.5	31 = N

$$x^2 = 2.675$$

$$(\approx 2.70)$$

(8)

	S	HiN	
UA	6	2	8
HA	0	7	7
	6	9	15 = N

$$P < .02$$

(9)

	S	HiN	
UA	6	5	11
HA	9.5	13.5	23
	15.5	18.5	34 = N

$$x^2 = 0.127$$

(10)

	I	Amb	E	
UA	7(5.5)	6(6.2)	4(5.3)	17
Nor	15(12.7)	12(14.2)	12(12.1)	39
HA	2(5.8)	9(6.6)	7(5.6)	18
	24	27	23	74 = N

$$\chi^2 = 5.279$$

(11)

	I	Amb	E	
UA	6.5(11.7)	13(10.1)	12.5(10.1)	32
HA	15.5(10.3)	6(8.9)	6.5(8.9)	28
	22	19	19	60 = N

$$\chi^2 = 7.931$$

(12)

	I	E	
UA	8.75	6.75	15.5
HA	7.75	7.75	15.5
	16.5	14.5	31 = N

$$\chi^2 = 0$$

(13)

	I	E	
UA	7	10	17
HA	10.5	6.5	17
	17.5	16.5	34 = N

$$\chi^2 = 0.735$$

(14)

	UA	Nor	HA	
M	4(5.9)	12(13.7)	10(6.3)	26
No M	13(11.03)	27(25.3)	8(11.9)	48
	17	39	18	74 = N
	$\chi^2 = 4.63$			

(15)

	UA	Nor	HA	
M	4(5.9)	10(12.5)	8(3.7)	22
No M	12(10.1)	22(21.5)	4(6.3)	38
	16	32	12	60 = N
	$\chi^2 = 3.32$			

(16)

	UA	HA	
M	9	7	16
No M	6.5	8.5	15
	15.5	15.5	31 = N
	$\chi^2 = 0.129$		

(17)

	UA	HA	
M	9.5	10.5	20
No M	7.5	6.5	14
	17	17	34 = N
	$\chi^2 = 0$		

(18)

	UA	Nor	HA	
D	9(9.9)	24(22.7)	10(10.5)	43
No D	8(7.1)	15(16.3)	8(7.5)	31
	17	39	18	74 = N

$$\chi^2 = 0.45$$

(19)

	UA	Nor	HA	
D	8(9.3)	19(18.7)	8(7)	35
No D	8(6.7)	13(13.3)	4(5)	25
	16	32	12	60 = N

$$\chi^2 = 0.78$$

(20)

	UA	HA	
D	8.5	4.5	13
No D	7	11	18
	15.5	15.5	31 = N

$$\chi^2 = 1.192$$

(21)

	UA	Nor	HA	
D	5(5.8)	6(6.4)	7(5.8)	18
No D	6(5.2)	6(5.6)	4(5.2)	16
	11	12	11	34 = N

$$\chi^2 = 0.52$$

(22)

	UA	HA	
A	9.5	14.5	24
R	13	7	20
	22.5	21.5	44 = N

$\chi^2 = 1.894$

(23)

	UA	HA	
A	14	7	21
R	9	12	21
	23	19	42 = N

$\chi^2 = 1.5$

(24)

	UA	HA	
A	4	5	9
R	7	6	13
	11	11	22 = N

$P > .05$

(25)

	UA	HA	
A	5	6	11
R	9	8	17
	14	14	28 = N

$\chi^2 = 0$

(26)

	UA	HA	
HiN	4(5.6)	7(5.3)	11
LoN	10(8.1)	6(7.8)	16
S	8.5(8.6)	8.5(8.3)	17
	22.5	21.5	44 = N

$x^2 = 1.85$

(27)

	S	LoN	HiN	
UA	3.5(6.02)	8.5(7.66)	11(9.3)	23
HA	7.5(4.97)	5.5(6.33)	6(7.69)	19
	11	14	17	42 = N

$x^2 = 3.2$

(28)

	S	HiN	
UA	1	6	7
HA	5	1	6
	6	7	13 = N

$P < .05$

(29)

	S	HiN	
UA	5.5	5.5	11
HA	3.5	7.5	11
	9	13	22 = N

$P > .05$

(30)

	S	HiN	
UA	7	7	14
HA	5.5	8.5	14
	12.5	15.5	28 = N

$\chi^2 = 0.03$

(31)

	I	Amb	E	
UA	8(6.64)	10.5(10.22)	4(5.62)	22.5
HA	5(6.35)	9.5(9.77)	7(5.37)	21.5
	13	20	11	44 = N

$\chi^2 = 1.5$

(32)

	I	Amb	E	
UA	7(7.11)	8(7.11)	8(8.76)	23
HA	6 (5.88)	5(5.88)	8(7.24)	19
	13	13	16	42 = N

$\chi^2 = 0.389$

(33)

	I	E	
UA	4.5	6.5	11
HA	7	4	11
	11.5	10.5	22 = N

$P > .05$

(34)

	I	E	
UA	6.75	7.25	14
HA	6.25	7.75	14
	13	15	28 = N

$\chi^2 = 0.03$

(35)

	UA	HA	
M	7	7	14
No M	15.5	14.5	30
	22.5	21.5	44 = N

$\chi^2 = 0.04$

(36)

	UA	HA	
M	9	7	16
No M	14	12	26
	23	19	42 = N

$\chi^2 = 0.02$

(37)

	UA	HA	
M	6.5	5.5	12
No M	4.5	5.5	10
	11	11	22 = N

$P > .05$

(38)

	UA	HA	
M	8.5	7.5	16
No M	5.5	6.5	12
	14	14	28 = N

$\chi^2 = 0$

(39)

	UA	HA	
D	13	13	28
No D	9.5	8.5	18
	22.5	21.5	44 = N

$x^2 = 0.01$

(40)

	UA	HA	
D	16.5	11.5	28
No D	6.5	7.5	14
	23	19	42 = N

$x^2 = 0.19$

(41)

	UA	HA	
D	5.5	5.5	11
No D	5.5	5.5	11
	11	11	22 = N

$x^2 = 0$

(42)

	UA	HA	
D	6.5	8.5	15
No D	7.5	5.5	13
	14	14	28 = N

$x^2 = 0.14$

A P P E N D I X   XX

CALCULATION OF INDIVIDUAL  
CONTRIBUTIONS TO THE VARIANCE

Extrapolating from Appendix XV111 the correlation coefficient and the beta coefficient for each variable was multiplied together as outlined in GARRETT 1966 (p. 419) in order to give

(i)  $R^2$  - the proportion of the variance of the criterion measure.

and (ii) the contribution of the individual variables to  $R^2$ .

These are set out below for each of the groups.

YB Reading

Variable	$\gamma$	$\beta$	$\beta \times \gamma$
Parental Attitude	.253511	.2147	.054428
C.A.	.100360	.0880	.008831
I.Q.	.389166	.4720	.183686
N.	.257969	.2503	.064569
E.	.199408	.1452	.028954
Perinatal distress	.178405	.2944	.052522
Parental disturb.	.080546	.0131	.001047

$R^2 = .394039$

$R = .62$

OB Reading

Variable	$r$	$\beta$	$\beta \times r$
Parental Attitude	.079858	-.0036	-.00287
C.A.	.239175	.1864	.044582
I.Q.	.663703	.6731	.446738
N.	-.040074	-.0284	.001138
E.	-.314797	-.3167	.099696
Perinatal distress	.133751	.1176	.015729
Parental disturbance	.109663	.0604	.006623

$$R^2 = .614219$$

$$R = .78$$

YG Reading

Variable	$r$	$\beta$	$\beta \times r$
Parental Attitude	.211644	.1047	.022159
C.A.	.493453	.6240	.307915
I.Q.	.098130	.5440	.053383
N.	.332594	.3696	.122927
E.	.159367	.0529	.008435
Perinatal distress	-.242472	-.2270	.055041
Parental disturbance	-.172491	-.1776	.030634

$$R^2 = .600494$$

$$R = .77$$

OG. Reading

Variable	$r$	$\beta$	$\beta \times r$
Parental Attitude	.061327	.1229	.007537
C.A.	.262774	.3189	.083799
I.Q.	.636359	.7579	.482296
N.	-.023459	.0262	-.000614
E.	.076713	-.2043	-.015672
Perinatal distress	.275503	.0940	.026142
Parental disturbance	-.005167	-.0243	.000124

$$R^2 = .583613$$

$$R = .763945$$

YB. Arithmetic

Variable	$r$	$\beta$	$\beta \times r$
Parental Attitude	.261382	.2419	.063228
C.A.	.375575	.4482	.168333
I.Q.	.426890	.4669	.199315
N.	.092127	-.0396	-.003648
E.	.199390	.1016	.020258
Perinatal distress	-.193784	-.1329	.025758
Parental disturbance	-.147990	-.1720	.025454

$$R^2 = .498698$$

$$R = .706185$$

O.B. Arithmetic

Variable	$\gamma$	$\beta$	$\beta \times r$
Parental Attitude	-.215668	-.2971	.064074
C.A.	.082818	-.0006	-.000049
I.Q.	.472429	.5252	.248119
N.	-.255389	-.2898	.074011
E.	.010112	-.0720	-.000728
Perinatal distress	.002900	-.1720	-.000498
Parental disturbance.	.045877	.0587	.002692

$R^2 = .389077$   
 $R = .62$

Y.G. Arithmetic

Variable	$\gamma$	$\beta$	$\beta \times r$
Parental Attitude	-.238288	-.07839	.018679
C.A.	.278978	.5812	.162142
I.Q.	.406940	.7677	.312408
N.	-.052932	.2213	-.011714
E.	-.367037	-.3364	.123471
Perinatal distress	-.320721	-.2181	.069949
Parental disturbance	.235267	-.1873	-.044066

$R^2 = .630869$   
 $R = .79$

OG Arithmetic.

Variable	$\tau$	$\beta$	$\beta \times \tau.$
Parental Attitude	.124045	.2048	.0254
C.A.	.391754	.3853	.1509
I.Q.	.474817	.5120	.2431
N.	-.009200	.0705	-.0007
E.	.272148	.0555	.0151
Perinatal distress	.221082	.1719	.0380
Parental disturbance	.611174	.0011	.00001

$$R^2 = .471921$$

$$R = .678$$

A P P E N D I X XXI

## TABULAR SUMMARIES OF RESULTS

Correlations of variables with reading and arithmetic attainment.

Variable	READING				ARITHMETIC				RDG.
	YB	OB	YG	OG	YB	OB	YG	OG	BI
P.A.	+d	+	+	+	+a	-	-	+	-
C.A.	+	+a	+e	+	+b	+	+	+d	+
I.Q.	+e	+e	+	+e	+e	+e	+a	+b	±
N.	+a <sup>(1)</sup>	-	+	-	+	-	-	-	+
E.	+a	-c <sup>(1)</sup>	+	+	+	+	-	+	-
M.	+	+	-	+	-	+	-	+	+a <sup>(1)</sup>
D.	+	+	-	-	-	+	+	+	+

a Significant at .05 level

b Significant at .01 level

c Significant at .02 level

d. Significant at .025 level

e Significant at .005 level

(1) Two-tailed

Reading/arithmetic achievement: summary of significances of chi-square and Fisher tests.

[illegible]

\*In opposite direction to hypothesis  
(two-tailed.)

(1) Considering only under and high achievers.

M = perinatal emotional maternal distress

D = parental emotional disturbance.

SUMMARY OF THE INDIVIDUAL CONTRIBUTIONS TO THE VARIANCE (Reading and arithmetic attainment.)

<u>READING</u>												<u>ARITHMETIC</u>																			
YB				OB				YG				OG				YB				OB				YG				OG			
Variable	%			Variable	%			Variable	%			Variable	%			Variable	%			Variable	%			Variable	%						
I.Q.	18.4		I.Q.	44.7		C.A.	30.8	I.Q.	48.2		I.Q.	19.9		I.Q.	24.8		I.Q.	31.2		I.Q.	24.3										
N.	6.5		E.	9.9		N.	12.3	C.A.	8.3		C.A.	16.8		N.	7.8		C.A.	16.2		C.A.	15.1										
P.Att.	5.4		C.A.	4.4		M.	5.5	M.	2.6		P.Att.	6.3		P.Att.	6.4		E.	12.4		M.	3.8										
M.*	5.3		M.	1.6		I.Q.	5.3	E.	- 1.5		M.*	2.6		D.	0.2		M.	7.0		P.Att.	2.5										
E.	2.9		D.	0.6		D.	3.1	P.Att.	0.7		D.*	2.5		E.	- 0.01		P.Att.	1.9		E.	1.5										
C.A.	0.8		N.	0.2		P.Att.	2.2	N.	- 0.06		E.	2.0		M.	- 0.01		D.	- 4.4		N.	- 0.06										
D.*	0.1		P.Att.	- 0.00		E.	0.8	D.	0.01		N.	- 0.3		C.A.	- 0.01		N.	- 1.2		D.	0.001										

\* M = Perinatal Emotional Maternal Distress  
D = Parental Emotional Disturbance

# Notre Dame Child Guidance Clinic

## SCHOOL REPORT

### CONFIDENTIAL

Name of Pupil ..... Date of Birth .....

Home Address .....

Present School ..... Date of Entry .....

Previous Schools (if any) .....

Class ..... Average age of class-mates .....

Class Teacher .....

Position in Class:    Top        Middle        Bottom        (*Underline*).

Is the Pupil:        Bright    Average    Dull

Has the Pupil any *special* difficulties with any of the ordinary school subjects?

Has the Pupil any *special* abilities?

Has any marked deterioration in school work been noticed at any particular time?

Has attendance at school been regular?

Attitude to teachers:

Attitude to other children:

Social behaviour:    Leader        Follower        Unsociable        Rough        Timid?

What signs of abnormal behaviour have been noticed?

GENERAL REMARKS:

*Further observations, if desired, overleaf.*

*Signature of Teacher*.....

*School* .....

A P P E N D I X XX111

CORRELATIONS WITH THE CRITERION AND WITH OTHER  
INDEPENDENT VARIABLES OF SUPPOSED SUPPRESSOR  
VARIABLES.

GROUP	N	r. REQ'D .05 significance	R.C.*	r. with OTHER VARIABLES	C.V.**
N YB Arith	44	-.257	.092	P.Att .177 I.Q. .259 M*** -.16 D**** .196	-.03
N YG Arith	22	-.360	-.053	P.Att .364 C.A. -.113 I.Q. -.285	-1.2
N OG Rdg	34	-.296	-.024	C.A. -.111 M -.126 D -.239	-0.06
N OG Arith	28	-.317	-.009	P.Att .122 C.A. .135 I.Q. -.055 E. -.158 M -.092 D .151	-0.06
E OB Arith	44	+.257	.01	P.Att -.089 C.A. -.082 N -.122 M -.135 D .046	-0.01
E OG Rdg	34	+.296	.077	P.Att .172 C.A. -.161 I.Q. .403	-1.5

GROUP	N	r. REQ'D .05 SIGNIFICANCE	R.C.*	r. with OTHER VARIABLES	C.V.**
M OB. Arith	42	-.257	.003	P.Att -.196 C.A. .173 I.Q. .061 N -.209 E -.135 D .242	-0.01
D YG Arith	22	-.360	.235	P.Att -.462 I.Q. .467	-4.4

\*R.C. = r with criterion

\*\*C.V. = Contributions to the variance(%)

\*\*\*M = Perinatal Emotional Maternal Distress

\*\*\*\*D = Parental Emotional Disturbance.

"r with other variables" reported where it is greater than  
r with criterion.

SOURCE: Appendix XV111

A P P E N D I X XXIVSUGGESTED EXTENDED MODEL USING SETS OF DUMMY  
VARIABLES AND ALLOWING FOR INTERACTION.

A discussion in JOHNSTON (1972 pp. 180 - 183) gives rise to the following model to give a finer and perhaps more meaningful analysis of the Parental Attitude data. The model here introduces size of, and position in the family for universality.

A table of dummy variables was derived for parental attitudes as categorized in this study and for hypothetical data concerning size of, and position in the family.

Very rejecting parents	are denoted by the numeral	1
Slightly rejecting	" " " " " "	2
Accepting	" " " " " "	3
Highly accepting	" " " " " "	4 <sup>(1)</sup>

"Family size" and "position in the family" are combined thus: families are assumed to be of one, or two, or of three or more siblings--

- 1 (size) 1 (position) denotes a singleton -
- 2 1 denotes the elder of two sibs
- 2 2 denotes the younger of two sibs
- 3 1 denotes the eldest of a family of three or more sibs
- 3 2 denotes the intermediate position in a family of three or more sibs.
- 3 3 denotes the youngest in a family of three or more sibs.

---

(1) These could be extended to all seven categories used in this research.

Interaction

So far this does not allow for any interaction between the different sets of dummy variables. By introducing additional dummy variables such interaction can be allowed for.

If we use the symbol

$$E(Y/\underline{1}, \underline{11}, \underline{1})$$

to indicate the expected value of Y, given

parental attitude 1

size of family 2

and position in family 1.

It can be seen from Table A1 that

$$E(Y/\underline{1}, \underline{1}, \underline{1}) = B_1$$

$$E(Y/\underline{1}, \underline{11}, \underline{1}) = B_1 + B_5$$

$$E(Y/\underline{1}, \underline{11}, \underline{11}) = B_1 + B_6$$

$$E(Y/\underline{1}, \underline{111}, \underline{1}) = B_1 + B_7$$

$$E(Y/\underline{1}, \underline{111}, \underline{11}) = B_1 + B_8$$

$$E(Y/\underline{1}, \underline{111}, \underline{111}) = B_1 + B_9$$

$$E(Y/\underline{11}, \underline{1}, \underline{1}) = B_1 + B_2$$

$$E(Y/\underline{11}, \underline{11}, \underline{1}) = B_1 + B_2 + B_5 + B_{10}$$

$$E(Y/\underline{11}, \underline{11}, \underline{11}) = B_1 + B_2 + B_6 + B_{11}$$

$$E(Y/\underline{11}, \underline{111}, \underline{1}) = B_1 + B_2 + B_7 + B_{12}$$

$$E(Y/\underline{11}, \underline{111}, \underline{11}) = B_1 + B_2 + B_8 + B_{13}$$

$$E(Y/\underline{11}, \underline{111}, \underline{111}) = B_1 + B_2 + B_9 + B_{14}$$

$$\begin{aligned}
E(Y/\overline{111}, \overline{1}, \overline{1}) &= B_1 + B_3 \\
E(Y/\overline{111}, \overline{11}, \overline{1}) &= B_1 + B_3 + B_5 + B_{15} \\
E(Y/\overline{111}, \overline{11}, \overline{11}) &= B_1 + B_3 + B_6 + B_{16} \\
E(Y/\overline{111}, \overline{111}, \overline{1}) &= B_1 + B_3 + B_7 + B_{17} \\
E(Y/\overline{111}, \overline{111}, \overline{11}) &= B_1 + B_3 + B_8 + B_{18} \\
E(Y/\overline{111}, \overline{111}, \overline{111}) &= B_1 + B_3 + B_9 + B_{19}
\end{aligned}$$


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$$\begin{aligned}
E(Y/\overline{1V}, \overline{1}, \overline{1}) &= B_1 + B_4 \\
E(Y/\overline{1V}, \overline{11}, \overline{1}) &= B_1 + B_4 + B_5 + B_{20} \\
E(Y/\overline{1V}, \overline{11}, \overline{11}) &= B_1 + B_4 + B_6 + B_{21} \\
E(Y/\overline{1V}, \overline{111}, \overline{1}) &= B_1 + B_4 + B_7 + B_{22} \\
E(Y/\overline{1V}, \overline{111}, \overline{11}) &= B_1 + B_4 + B_8 + B_{23} \\
E(Y/\overline{1V}, \overline{111}, \overline{111}) &= B_1 + B_4 + B_9 + B_{24}
\end{aligned}$$

Such a scheme allows for interaction effects. Thus the difference between a very rejected singleton ( $\overline{1}, \overline{1}, \overline{1}$ ) and a highly accepted singleton ( $\overline{1V}, \overline{1}, \overline{1}$ ) is  $B_4$ .

Both JOHNSTON (1972) and KERLINGER and PEDHAZUR (1973) give full discussion on the use of such a model.

**TABLE A1**  
**SUGGESTED MODEL USING THREE SETS OF DUMMY VARIABLES AND ALLOWING**  
**FOR INTERACTION.**

[illegible]

**Cont'd...**

S\* = Size of family  
P\*\* = Position in family

TABLE A1 (cont'd)

[illegible]

S\* = Size of family  
P\*\* = Position in family

A P P E N D I X XXVTHE INTEGRATED DAY\*DEFINITION

The integrated day is an untimetabled day which offers a rich choice of activity within a well planned educational environment. The purpose of this organisation is to give the child an opportunity for social, intellectual, physical and aesthetical growth at his own rate of development. Because of the informal atmosphere within the classroom there will be closer pupil teacher contact, and a greater opportunity for the teacher to observe and record the responses of each child.

Joy Taylor in her book "Organising and Integrating the Infant Day" (1971 p.54) warns us that there can be no blue print or set of rules for the integrated day. There is and there should be variety of form and of degree which in some circumstances may mean more integration and in others less.

PREPARATION.

1. Teacher fully understands basic skills to be acquired by the children in a particular class.
2. The children have become accustomed to well organised group work.
3. The teacher has provided a rich environment with wide choice of activities for the Free Hour or Free Afternoon.

A GRADUAL START.

1. For the first few weeks the teacher continues with the group work and the class lessons which are part of the day. She observes children working during the free hour noting the advantages gained by the children and changes that still need to be made.

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\* The writer is indebted for the bulk of this appendix to Sister Patricia Short of Notre Dame College of Education, Glasgow. It was written as part of an introduction to a course for pre-service teachers on recent trends in education.

2. The period for free choice will extend as the environment is enriched and assignment cards etc. are improved.
3. "Free afternoon" could become free period in the morning.
4. A group activity could be taken during the free choice time. It may be necessary to cope with the noise level at this stage. This is a bigger "problem" for the teacher than for the children.
5. Play or recreational activities could be included in that part of the day which is not free. The teacher must insist at all times that apparatus is put away carefully. They need to be reminded of this continually.
6. It is essential that the teacher has good class control.. If she feels this is lacking then she must reduce the time given over to free choice and examine carefully the materials in the room instructions given to the children and her own particular style of record-keeping. She should in no way feel guilty about going back to an organisation which is more familiar, she may need this opportunity to evaluate her own performance in the classroom.

#### THE INTEGRATED DAY.

By now the child exercises a greater degree of choice about what he is going to do and when he is going to do it. He is acquiring a little personal responsibility. He knows that he must accomplish some work in reading, writing and maths. The teacher's planning and organisation continue to be unobtrusive but extensive.

Certain periods of the day continue to be timetabled in order to fit in with the wishes of other members of staff. There are certain times set aside each day for the use of the hall or the T.V. room. Religious Education may be taken at a specific time each day.

### A DESCRIPTION OF A PARTICULAR SITUATION.

A vertically grouped Infant class of 38 children aged 4 years 9 months to 7 years 3 months in a school which was opened in 1964. This classroom is well equipped with tables, storage units, dividers, shelving and a kitchen bay complete with Baby Belling stove. The teacher has created a rich environment by equipping the Maths., English and Art bays with a wide variety of material and equipment. In addition to the bays there will be a Home Corner, a Nature table and a Music Corner.

The child does not own a place, he will move freely from Maths bay to English bay to Art bay according to the nature of the activity. He will have a small storage unit for his own personal possessions.

### A TYPICAL DAY.

The children enter the classroom as they arrive in school. Some remain in the playground until 9.00.

- 9.00. All children in classroom.  
 Some will continue work left the previous day - a piece of creative writing, a frieze, measuring. The teacher may hear children read individually. (Perhaps this was started at 8.40).  
 Routine jobs - feeding the pets  
                   - collecting numbers for milk and dinners  
                   - mixing paste etc. etc. etc.
- 9.15. Assembly in the Hall.
- 9.35. Children return to classroom.  
 Each child is responsible for reading, writing and mathematics. A system of record-keeping will prevent a child from repeating work from choosing something that is too easy, from escaping the teacher's attention. During the day the teacher will make sure she takes each group for reading, writing and mathematics. Does she insist that children leave what they are doing and work with her? Yes, sometimes she does if she feels it is necessary and there isn't an opportunity to reach that child later in the day. During the first part of the morning there are various activities in progress.

Shopping and recording.  
 Playing with toys.  
 Sewing recorder bag.  
 Writing stories.  
 Phonics group with the teacher.  
 Younger children collecting items on Number Trays.  
 4 children at painting easels.  
 6 children playing word bingo.  
 6 children cooking.

The teacher moves round the room giving help when it is needed. Even when she has a small group for word matching she will pause to attend to a child needing help with estimation.

- 10.30 Children start to have milk, a few at a time.  
 The teacher may send 7 children to have milk before taking them for multiplication.
- 10.40 Playtime.
- 11.00 P.E. on large apparatus in hall.  
 N.B. Use of hall is timetabled.
- 11.25 Back to work in the classroom.
- 12.05 Tidy-up time. Children and teacher have a few minutes together before dinner.

#### THE ADVANTAGE OF INTEGRATED DAY.

1. The more individualised learning in content and pace makes for more interest and involvement on the part of the children.
2. The children are trained to use resources to discover things for themselves, "to learn how to learn".
3. The child develops a sense of responsibility.
4. The teacher has time to observe the children's responses and to make worthwhile records of individual progress and development.

#### A WORD OF WARNING.

1. A flexible integrated approach to learning makes considerable demands on teachers. It could impose strain and pressure on the teacher especially in the early stages.
2. Because it is informal and offers freedom of choice to the children, a classroom situation may look good but on closer examination one may find little learning is actually taking place.

3. Staff should not be coerced into adopting an integrated day. This would be offering freedom to children while denying it to teachers.
4. As the children become immersed in individual activities, the teacher must always remember to provide group work and even some class work so that the social development of the child is not neglected.
5. Parents should be informed of major changes in school administration, e.g. integrated day, vertical grouping, team-teaching. Lack of information can engender hostility and even opposition.

### CONCLUSION.

The success or failure of the integrated day depends on the energy, competence and insight with which individual teachers choose to bring about the informal situation within their own classrooms.

The following are four quotations which the writer feels are germane to any perspective concerning the "integrated day".

- 1) The state of thought surrounding open education is primitive. The assumptions we have seen which characterize the thinking of open educators are hunches, based largely upon impressions, feelings, emotional responses and observations in classrooms. Collectively the assumptions do not constitute a coherent system or structure. There are inconsistencies and voids. There is no rigorous research supporting most of the assumptions"  
WALTON (1971 p.17)
- 2) "Another important area clearly the concern of the psychologist is that of motivation. In many ways it has been argued that motivation is an integral part of learning through experience, from a continuum of simple reinforcement theories to the most complex theories of social learning... children learn best in situations in which they are actively involved which grow out of their self-elected enthusiasm and that it is illogical to allow artificial barriers to interfere with the natural course of their investigations. This freedom of choice towards the child's own interests is a common denominator of all versions of the integrated day I have seen or heard about". DAVIS (1971 p.60)

- 3) "A further aspect of reading in which a comparison might be drawn is that of individual reading practice through graded schemes or other material. An analysis of this activity showed that the teachers of deliberately vertically grouped classes require it of their pupils with the same frequency as their counterparts in the other non vertically grouped category". BULLOCK REPORT (1975 p.202)
- 4) "The final outcome variables that I wish to identify are of an affective character and consequently perhaps the most difficult to isolate. To what extent does a child display positive attitudes and emotions? Does the child find increased gratification in coping with problems? Is the child less dependent on authority? Here again I sense that the integrated day approach organized in terms of common needs and problems of the pupil may be distinctly superior to the conventional subject-centred programme, but on reflection I don't really know". DAVIS (1971 p.64)

