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THE RELATION BETWEEN THE OBSESSIONAL CHARACTER
AND ASPECTS OF COGNITIVE PERFORMANCE

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ABSTRACT

This research aims to examine the relation between obsessionality and aspects of cognitive performance in secondary school children.

The obsessional character is typified by such traits as orderliness and caution, and may be distinguished from the obsessional neurotic who displays varied clinical symptoms. An examination of the literature attempts to ascertain the nature of relationships between obsessional attributes and cognition, but the majority of studies concentrate on adult clinical populations. The cognitive style of reflection-impulsivity is considered in view of its superficial similarity to the obsessionality dimension but it is found to be a narrow concept at its most discriminating with younger children.

Means of assessing obsessionality psychometrically are examined with particular reference to six tests, only one of which has a variant suitable for use with children, the Easy Reading Version of Kline's Ai3Q. Data on reliability and validity for this test are sought in a series of three studies with 12 and 13 year old children; it is concluded that it can satisfactorily discriminate between children of this age who may be labelled high or low obsessionals. Sex differences were also found.

Two studies of cognitive performance are carried out using four tasks involving speed and accuracy. The results confirm in general hypotheses that high obsessional children perform more accurately and with less speed than low obsessionals, but some interaction effects with sex are noted as well as indications of possible task-specificity.

The results are discussed in the light of such factors as under-inclusive thinking and theories of reversal and arousal. It is concluded that obsessionality is an important variable to be considered when investigating cognition in children.

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THE RELATION BETWEEN THE OBSESSIONAL CHARACTER AND ASPECTS OF
COGNITIVE PERFORMANCE

1. INTRODUCTION

The main aim of this research was to investigate the relationship between the obsessional character, as measured by Kline's (1971a) questionnaire, and performance on cognitive sorting tasks, in a sample of secondary school children.

The obsessional personality has been recognized for some time in the psychiatric literature. It has been described as clean, orderly, conscientious and precise, and is accepted by major text books such as Mayer-Gross, Slater and Roth (1966).

Psychoanalytic literature has also recognized a constellation of traits, particularly orderliness, obstinacy and parsimony, referring to it as the anal character. In the view of Freud (1908) this character was derived from repressed anal eroticism. In this research, however, the cluster of traits will be referred to as the obsessional character, with no suppositions made about anality.

Given that the obsessional is careful, neat, methodical and cautious, it was expected that this type of person would differ from non-obsessionals in tasks involving sorting, classifying and categorising. It was these areas which the present study set out to investigate.

2. OBSESSIONALITY AND COGNITION: THE BACKGROUND.

Since time immemorial people have differed in terms of their behaviour and attitudes. Such traits as carefulness, neatness, orderliness and caution have existed for aeons.

However, it was not until 1908 that Freud brought together these facets of personality in his theories relating to anal eroticism. There was a clear link, in Freud's mind, between the expulsive elimination of faeces and emotional outbursts, temper tantrums and rages. He contended that toilet training, which is perhaps a child's first real encounter with discipline (Hall 1954), represents a conflict between an instinctual cathexis (the wish to defecate) and an external barrier and that the consequences of this conflict were bound to leave their mark on the personality of the developing child. The ways in which control and cleanliness are brought about by the mother would determine how the personality develops.

If toilet training is strict and punitive, the child may retaliate by soiling himself on purpose and become messy, irresponsible disorderly and extravagant. However, the same strictness may bring about a reaction formation resulting in compulsive orderliness, meticulous neatness, fastidiousness and over-controlled behaviour.

If toilet training emphasises extravagant rewards for every bowel movement then the child will learn to place great value on his products and may grow up to be generous, charitable and philanthropic. If excessive praise is the order of the day then the child may not want to give up his valuable products and he may become extremely thrifty and parsimonious.

)

Fixation on the retention of faeces may develop into an avid interest in collecting, possessing and retaining objects. By the same token, however, if reaction formation sets in then the opposite effect might result with the child growing up to indulge in reckless gambling, foolish investing and generally giving away his possessions (Hall 1954).

)

According to Sears (1951), the three cardinal traits of the anal character are stinginess, orderliness and obstinacy. In an experiment he carried out on college men he found a slight tendency for the anal character traits to form the kind of constellation observed by Freud. The correlations between the three traits were small but positive, and Sears noted that, by correlating the traits with popularity, orderliness was a desirable trait whereas stinginess and obstinacy were not.

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An important difference between the work of Freud and Sears above is that Freud's theories were based on his work with a clinical population and he did not explicitly hypothesise this group of traits as an important dimension in the non-clinical (for example, student) population (Eysenck and Wilson 1973) whereas Sears's experiment was specifically with a student (non-clinical) population.

)

This cluster of the traits of orderliness, cleanliness, conscientiousness and precision is generally referred to as obsessionality or the obsessional character in orthodox psychiatric literature (for example, Lewis and Mapother 1941) in preference to the term "anal character" used by Freud, since the hypothesised Freudian aetiology is not accepted. However, the two syndromes appear very similar (Delay et al. 1962).

Whatever one's theoretical leaning, it still seems that, like most syndromes, obsessionality covers a multitude of behaviours not all of which will be in evidence at all times in all individuals. Furthermore, the same behaviour in different people in identical circumstances may or may not be labelled "obsessional" depending on the degree of interference caused to everyday life or to those close to the person concerned. Thus the borderline between normal and abnormal, and thence between clinical and non-clinical, may be vague and arbitrary, depending as much on subjective judgement and clinical standpoint as on objective observation of the behaviour concerned. However, the literature is strewn with studies of what may be called "severe" cases of obsessional behaviour, usually psychiatric in-patients, as well as more "normal" obsessionals who have not been classified in psychiatric terms. This review will attempt to clarify the differences between the two populations in terms of thinking and associated cognitive behaviour.

There have been a number of studies which have looked at the intellectual status of obsessionals (Kraepelin 1921, Greenacre 1923, Rudin 1953, Pollitt 1960, Judd 1965, Kringlen 1965, Lo 1967, Noreik 1970) but many of these can be criticised on the grounds of lack of adequate control groups and a basis on clinical assessment rather than on objective tests (Black 1974). Nevertheless, the above studies agreed in the general finding that obsessionals were more intelligent compared with a variety of other groups such as non-obsessional neurotics and schizophrenics.

However, this finding warrants closer examination. Lo (1967), for example, assessed intelligence by "information given by a close relative or friend, by the school and work records and by the clinical impression of the psychiatrist." Information from relatives and

) friends would naturally be purely subjective and dependent upon the values placed on "intelligence" by the persons making the judgments, and upon their concept of intelligence, quite apart from the ability of those relatives and friends to make such judgments and their motivation in doing so. Information from school would presumably be based on attainments in class, which would be dependent on such factors as the pupil's motivation and interest, the teacher's ability to motivate and teach his pupils, the value the teacher puts on intelligence and the basis for his judgments, possible halo effects in judging, and other subjective factors. Information from work would also relate to motivation and perhaps time-keeping, carrying out instructions (not whether the person could but whether he actually did), getting on with his superiors and of course the demands of the actual job. The clinical impression of the psychiatrist with regard to intelligence may well be as subjective as that of any other person. Indeed, one could argue that if the psychiatrists' judgments of intelligence have always been valid and reliable, then they need not have relied as they did on the psychometric assessment of intelligence by psychologists throughout the history of child guidance. It is thus contended that Lo's judgments of his patients' intelligence are extremely open to question and should not be used for the confirmation or denial of any hypotheses involving that construct.

) It is interesting to note that Lo also falls into the trap of tautology when he states that "intelligent people are likely to be more capable of thinking at an abstract level than unintelligent people". Generally speaking, objective measures of intelligence (and indeed subjective estimates) are heavily weighted with items involving abstract thinking in one form or another, so that the terms "intelligent" and "capable of thinking at an abstract level" are

synonymous and Lo's sentence is tautologous. In fact, Lo goes on to say that "abstract thinking predisposes to rumination and obsession", in which case we would expect more subjects in his obsessional sample to be judged above average or very high (Lo's highest categories on a 5 class scale) in intelligence. This was in fact the case, with 26 patients being so classified compared with only 10 rated "below average" or "very low". However, Lo does not make it clear when the judgments about intelligence were made - if they were made contemporaneously with the diagnosis of obsessional neurosis then one would have to suspect bias in those judgments. Certainly Lo gives no evidence to allay one's fears.

One further criticism of Lo's paper is that for a control group he selected an equal number (88) of schizophrenic patients. This his controls were a group of grossly abnormal individuals, hardly a population with which any other group of people could validly be compared.

Two studies using objective tests of intelligence (Slater 1945 and Ingram 1961) both found that obsessionals scored more highly than anxiety neurotics and hysterics, the latter writer admitting that he could offer no explanation beyond suggesting a genetic link or the possibility that training or "practice in abstract thinking predisposes to rumination and obsession".

In fact, Slater (1945) was particularly concerned to test out the four generally agreed assumptions that 1) neurotics on the whole are not abnormal regarding intelligence, 2) neuroses of different types occur among persons of different orders of intelligence, 3) obsessional neuroses tend to occur among the highly intelligent, and 4) hysterics occur more among the "backward". As these four generalisations rest on clinical evidence Slater set out to examine their validity using

objective tests. The tests he used were Raven's Progressive Matrices (Raven 1938), Cattell's IIA and IIB tests of intelligence (Cattell 1939), and the Shipley Vocabulary Test (Shipley and Burlingame 1941).

He used a male sample of 100 cases divided equally into obsessionals, anxiety states, hysterics and miscellaneous neurotics. The equal division was obtained automatically by his selection procedure which involved his sifting through the admissions to a mental hospital ward retrospectively over two years, selecting each obsessional case then allocating the next case to miscellaneous neurotic, drawing the next anxiety and hysteric cases and so forth.

His results indicated that on all the tests the obsessionals obtained higher scores than each of the other three groups, analysis of variance yielding an F of 23.95, $p < 0.01$. The other groups did not differ among themselves.

Slater made the generalised conclusion that the obsessionals were "more intelligent" than the other groups, although the Progressive Matrices may be said to measure only certain aspects of what is a global construct (intelligence), the Cattell tests are of the verbal-ability-to-make-abstractions type, and the Shipley test was specifically designed for measuring "intellectual impairment in psychotics" (Shipley and Burlingame 1941). Other, more acceptable, tests of general intelligence might have shown different results.

On the other hand, Wechsler (1965) states that, considering the many possible sources of error, intelligence test findings differentiating neurotic groups, including obsessionals, were completely insubstantial and had limited usefulness in practice. Nearly 20 years earlier, Rapoport, Gill and Schafer (1946), had failed to differentiate the scores of obsessionals from other groups on the original Wechsler-Bellevue scales. A similar fate met Gurvitz (1951)

when verbal-performance differences were examined in a number of different groups of clinical populations.

The conclusion of Fransella (1974) is that no convincing evidence has been produced to suggest that the obsessional differs "significantly from any other group in the way he performs on standard intelligence tests". However, it should be pointed out that in the studies quoted above the tests were conventionally scored and no analysis was made of the types of error made by the different groups. Reed (1969a) has suggested that this is what prevented Wechsler, for example, from finding an obsessional pattern.

In a series of studies, Reed (1968, 1969a, 1969b, 1977a, 1977b) examined the types of error made by obsessionals in various tasks involving verbal reasoning, memory and number. He initially proposed the hypothesis "that the formal characteristics of anankastic/obsessional cognition are directly related to functional impairment in the spontaneous organization and integration of experience. This is expressed in the over-structuring of input, and in the maladaptive over-defining of categories and boundaries". (Reed 1968). Thus in a task involving classification the obsessional would be overspecific in his interpretation of the given class and therefore too strict in his acceptance of appropriate class members and attributes. Reed then used two tasks to test the hypotheses, one task involving deductive reasoning (Reed 1969a), the other inductive reasoning (Reed 1969b).

In the former study Reed had three groups of subjects, 25 obsessional patients, 25 non-obsessional psychiatric patients and 25 normal controls. The task involved the subject being given class X and being required to produce X1, X2, X3 Xn or to select one or more of them from a set of alternatives, the objective being to deduce specific examples of the given class. Reed predicted that

the obsessional would select too few of the possible alternatives as being regarded as members of the given class. He felt this would not be apparent in terms of conventional scoring but would show up in the types of error made. Indeed, his predictions were supported. The scoring did not distinguish the three groups, but the obsessionals selected far fewer of the available alternatives. Reed felt that it was not so much what the obsessional did that should invite attention as how he did it.

In his second (inductive reasoning) study, Reed employed the Vigotzky test of concept formation using 22 blocks in 5 colours, 6 shapes, 2 heights and 2 sizes of horizontal surface. Again Reed had 3 groups, this time 10 obsessional patients, 10 psychiatric controls and 10 normal controls. The results indicated that obsessionals tended to over-structure the material when classification was required, they allocated fewer members to any one class and required more classes. Equally importantly, it was observed that the obsessionals displayed more indecision and doubt (about categories) and more anxiety as to the logic or aptness of those categories. Indeed, Strauss (1948) had related indecision to perfectionism, one of the attributes of the obsessional. Reed felt that the obsessionals' doubts seemed to be due to their inability to order the categorizable features they perceived in terms of task relevance and importance. They also lacked spontaneity in their approach.

If this indecision on the part of obsessionals reflected a formal cognitive characteristic then it should be observed in the slower performance of neutral tasks such as numerical tests. Reed (1977b) tested this argument with 30 obsessional patients, using 30 patients with non-obsessional psychiatric disorders as controls, hypothesising that in a structured task requiring concentration and a deductive

) approach (the Arithmetic subtest from the Wechsler Adult Intelligence Scale) the obsessionals would not be handicapped, and that in less structured tasks requiring an inductive approach (for example, completing the series 7, 14, 20, 25, 29 ...) the obsessional would be slower. Indeed, on the former task the obsessionals were superior to the controls ($p < 0.05$), whereas on the latter task the controls were superior ($p < 0.01$). Both tests had strict time limits and it is important to note that on the latter test (less structured, inductive approach), when the subjects were allowed to continue in their own time the difference between the two groups disappeared. Reed concluded that on unstructured tasks the obsessional was hindered by his own over-classificatory approach which involved him in the over-production of competing hypotheses. His approach delayed resolution of the task and his "uncertainty reflected the serial consideration of a chain of events".

) The characteristics of doubt, uncertainty and rumination might be expected to imply faulty memory or recall in obsessionals, although it has been noted that obsessionals give much precise detail in their recall of life-events. In order to investigate this paradox, Reed (1977a) used four tests of memory:

- 1) For long-term recall he used the Information sub-test of the W.A.I.S., although one might criticise this on the grounds that it measures general knowledge and factual information, and is highly culture-biased;
- 2) For immediate recall he used the Digit Span sub-test of the W.A.I.S., which Rapoport et al (op.cit.) claims measures attention more than any other factor;
- 3) Rehearsal of ambiguous material - four anecdotal problems constructed by Reed, 2 having solutions and 2 not;

4) Personal reminiscence - the subjects were asked about their last holiday and the previous day's routine, followed by questions about how they remembered it.

The findings were that the obsessionals did not excel in the long-term recall of information (test 1) or of meaningful anecdotal material (test 3 - solvable problems where rehearsal was encouraged). But they did show superiority at immediate recall (test 2) reflecting perhaps high levels of attention, and at recall of ambiguous material (test 3 - unsolvable problems where rehearsal was not encouraged), reflecting perhaps a tendency to the pointless rehearsal of such material. Also noted was weak redintegration of personal reminiscence (test 4), the obsessionals expressing uneasiness not as to what they were recalling but about the quality of the recalling itself. (Reed further observed that the obsessionals' recall was confined to visual imagery alone in all cases, a finding that merits more investigation.)

Reed refers to the tendency to over-define concepts as under-inclusion. When its converse, over-inclusive thinking, has been examined in obsessionals the results have been contradictory. Over-inclusion may be defined as "an ability to preserve conceptual boundaries, as a result of which distantly associated, or even irrelevant, ideas come to be regarded as essential parts of the concept" (Hawks 1964, following Cameron 1938, 1944). For example, Craig (1960) had found that obsessive/compulsive symptoms were associated with low scores on tests of over-inclusion, but Hawks (1964) thought that the opposite result should obtain (that is high scores) in view of the obsessive's reported "attention to irrelevant details, over-meticulous circumstantiality, vacillation and excessive partially relevant and irrelevant verbiage - the coming into consciousness of many associations related to an impulse or task, with concomitant difficulty and doubt in

selecting the task-appropriate one" (Rapoport 1951). In a retrospective study of 58 psychiatric patients who had been given 3 tests of over-inclusive thinking as part of their psychological examination, Hawks (op.cit.) correlated clinical information (for example, diagnosis, delusions, hallucinations, obsessions, compulsions) with the test scores and found no significant relationships between any pairs of variables including obsessive/compulsiveness and over-inclusion. There was only a slight tendency (non-significant) for schizophrenics to be more prone to over-inclusive thinking, perhaps paralleling the finding of Payne and Hewlett (1960) that their most over-inclusive subjects were paranoid schizophrenics.

It is interesting to note that at the conclusion of his paper, following the reporting of his non-significant findings, Hawks expresses the view that perhaps the test battery was not reliable enough for clinical use (this battery comprised the Goldstein-Scheerer object Sorting Test (Goldstein and Scheerer 1941), Benjamin Proverbs Test (Benjamin 1946) and the Shaw Block Test (Bromley 1956; Payne and Hewlett 1960)). He does not appear to entertain the possibility that perhaps the tests were reliable enough and valid, but that there really was no relationship between obsessive/compulsiveness and over-inclusive thinking as defined and tested. Furthermore, it might have been advisable for him to have carried out a reliability and validity study beforehand on the specific population he was to use for his main experiment.

3. COGNITIVE STYLE

Cognitive style may be defined as a characteristic way of thinking about or looking at a problem. A child with a specific cognitive style may nonetheless employ one of several plans of action, or strategies, to tackle a particular problem or situation. Style is perhaps a more theoretical position held by someone, whereas strategy denotes the actual behaviour one produces in a given set of circumstances. In practice the distinction between style and strategy is a fine one, and authors such as Cashdan and Lee (1963) use the terms interchangeably.

Many different cognitive styles have been reported - for example, Bruner (1956) distinguished two styles affecting concept attainment, "focussing" on a task or "scanning" it; Pask (1969,1976) has drawn a distinction between "holists", who look at broad relationships and generalities, and "serialists", who look at narrow relationships and specifics; Leach (1967) felt that rigidity versus flexibility was a relevant dimension in learning situations; in creativity Elshout and Elshout (1969) have distinguished styles of reasoning, and Guilford (1959) has drawn attention to the convergence - divergence continuum; field-dependence/independence has been the subject of many reports by Witkin and his colleagues since 1964; other styles have been differentiated by Thomas (1971) in reading, Dirkzwager (1974) in logical problem solving, and Klix (1971) on concept acquisition.

These various dimensions, styles or strategies may be said to predispose a person to behaving in a particular way in situations involving cognitive tasks. The evolution of the construct "cognitive style" reflects the efforts of researchers to conceptualise performance as the interaction between intellectual and non-intellectual variables.

In the area of cognition and obsessionality an important variable is the time taken to respond to particular tasks, and time

was an essential ingredient of the cognitive style described by Kagan and his co-workers as "reflection-impulsivity". This style will now be described in detail.

Initially, Kagan, Moss and Sigel (1963) stated that, in the field of perceptual organization and the conceptual process, the study of individual differences in style should be accorded much more attention. They suggested that one dimension which could account for differences found between individuals was the tendency to analyse and differentiate the stimulus environment as opposed to categorising based on the stimulus as a whole. It was hypothesised that a possible antecedent of this analytic style was an ability to inhibit motor discharge, that is, to reflect in situations where alternative hypotheses or solutions were available. (Teachers have long known that children of average intellectual skills, but with problems in reading, tend to be restless and impulsive, unable to cope with the reflective requirements of the reading situation.)

In a paper examining the analytic attitude, Kagan et al. (1964) found that two basic dispositions each contributed variance to the production of analytic concepts: 1) the tendency to analyse visual arrays into their component parts, and 2) the tendency to reflect over alternative solutions, where several response alternatives were available at the same time. These two dimensions seemed relatively independent of each other. The degree of reflection, as measured by the time taken to respond, showed a generality across a variety of tasks and displayed a marked intra-individual stability across a one-year period.

Kagan and his colleagues now developed a test, called the Matching Familiar Figures Test (M.F.F.), designed to provide a measure of reflection, which was "defined semantically as the consideration of

alternative solution hypotheses (either classifications or problem solving sequences) when many are available simultaneously. Reflection does not refer to delay that is the result of fear or failure, timidity or inability to generate any solution." (Kagan et al., 1964, p.33)

The test comprised a sequence of standard drawings of everyday objects (for example, tree, cat, leaf), each presented simultaneously with six variants. The subject's task was to select the one variant that was identical to the standard. The data were the response latencies (the time taken before the first response was made) and the number of errors.

Initially Kagan regarded the response latencies as the more important criterion in judging reflectivity (which now gained the label of impulsivity for its opposite pole) since error scores seemed to relate consistently to verbal skills whereas response times seemed to be independent. (Kagan et al. 1964). However, he soon began to take into account error scores (Kagan 1965 a,b,c). He had found a negative correlation (between response latency and errors) of around 0.5, suggesting that reflective delay was associated with an improved score (lack of error). So he differentiated reflective children as those showing long delays and making few errors, from impulsive children, who respond quickly and make many errors. This division also results in two further, though numerically much smaller, groups - one responding quickly but with few errors (fast/accurate), the other responding slowly but with many errors (slow/inaccurate), although these two groups are seldom commented on in the literature. Siegelman (1969) justifies this in her work by stating that "while reflection is conceived as a unitary variable, for empirical purposes classification of subjects has utilised a dual criterion (response time and errors) to permit refinement of classification by ruling out small extreme groups in which

either exceptionally high intelligence or exceptionally high fearfulness causes atypical behaviour." Kagan, Pearson and Welch (1966) claimed that the use of two criteria (time and errors) was essential only in the case of "large" samples, whereas with "small" samples it was adequate to use time only. However, Denney (1973) used only the time criterion with a sample of 64 seven-to-eight-year-olds, as did Drake (1970) with 18 children and 16 adults although she also modified the M.F.F. so that only 1 variant at a time was shown with the standard for the comparison task which simply demanded a response of "same" or "different". The majority of researchers have utilised a double median split (whereby the sample is divided into four parts by splitting at the median score for errors and the median score for time, giving "slow and accurate", "slow and inaccurate", "fast and accurate" and "fast and inaccurate" groups) to obtain their reflective (slow and accurate) and impulsive (fast and inaccurate) groups, and their findings will now be considered before certain methodological issues are brought into the open.

If any test is to be useful it has to be reliable. Data on the reliability of the M.F.F. come from several sources. Stability over time was examined by Yando and Kagan (1968) using a 6 month interval with 160 six-year-old children. They found that with response latencies the stability coefficient for girls was +0.70 whilst for boys it was only +0.13, commenting that response times are "typically more stable for girls than boys in the early years." When errors were considered the stability coefficients were +0.23 for girls and +0.24 for boys. A shorter time interval (3 weeks) was employed by Adams (1973) who also tested six-year olds (n=50). For response latencies the reliability (stability) coefficient was +0.58 with both sexes combined, while for errors it was +0.39, both being statistically significant at

the 1% level. Adams concluded that the test was a reliable instrument "at least for research purposes". A short time interval was also used by Siegelman (1969) with 100 boys, median age 9 years 7 months, of whom 65 were selected by the double median split. Her reliability coefficients were +0.73 for response latency and +0.43 for errors, both significant at the 1% level. However, these coefficients were criticised by Cairns (1977) on the grounds that Siegelman did not retest the 35 subjects who did not meet the double median split criterion on the first test, the error scores were further affected because on the second test a maximum of one error per trial was permitted instead of the usual six, and furthermore the administration of the M.F.F. was mechanised with the position of the stimuli altered and the size reduced, making comparisons with the original version difficult.

Cairns' (1977) own study on the reliability of the standard 12 item version of the M.F.F. in fact examined internal consistency by assigning items to two sets according to two criteria - the position of the item in the first or second half of the whole test and the position of the "target" (correct answer) for that item. Therefore the final division resulted in two six-item sets, each containing one item at each of the six target positions and three items from the first and three from the second half of the test. Thus this was a split-half method. With 50 nine-year-old boys he obtained a reliability coefficient of +0.94 for response latencies ($p < 0.001$) and for errors of +0.46 ($p < 0.01$). For 50 eleven-year-olds, the coefficients were +0.95 ($p < 0.001$) for response latencies and +0.52 ($p < 0.001$) for errors. Applying the Spearman-Brown correction for the length of the test the reliabilities increased for the full test to +0.96, +0.63, +0.97 and +0.68 respectively. Cairns concludes that response time is a

"reasonably reliable" measure but the error scores' reliability is "less than satisfactory". He feels that this has serious implications for the wisdom of including error scores in the operational definition of reflective and impulsive performance. This "lack of reliability" may explain why some researchers have had problems attempting to alter error scores and why one study (Debus, 1970) found an increase in errors on retest with the control group. Furthermore, considering Cairns used the full 12 item M.F.F., the results obtained by Drake (1970) using a 5 item version, and Meichenbaum and Goodman (1971) with a 6 item version, must be called into question. Cairns simply advises to treat error scores "with caution".

Another measure of the usefulness of this test is its ability to predict behaviour in other settings, that is the generalisability of the reflectivity-impulsivity dimension. The stimulus to further research into the generalisability aspect came from Kagan, Pearson and Welch (1966), who examined seven areas of reasoning in 155 six year olds. These areas included: 1) Haptic Visual Matching, where the child had to examine a three-dimensional wooden form he could not see, then select it from five visually displayed alternatives (variables: exploration time, response latency to first selection and number of errors); 2) Picture Completion Reasoning, where the child was shown a page with 3 pictures telling a story, then he had to select one out of four alternative pictures to finish the story logically (variables: response time to first selection and whether response was correct); 3) Vocabulary sub-test from the W.I.S.C.; 4) Exploration reasoning test, where the child was shown a series of shapes linked by a principle, then he had to select one that came next (variables: response time and whether correct); 5) Guessing objects, where the child was told three attributes of an object and he was asked to guess what it was;

6) Information sub-test from the W.I.S.C.; 7) Self-evaluation, where the child had to indicate on a ten-inch line where he ranked himself on various constructs (such as fastest-slowest, strongest-weakest,). Using a double median split the authors obtained 25 impulsive and 30 reflective boys, and 26 impulsive and 26 reflective girls. Their results indicated that impulsive children had faster response times and higher error scores on inductive reasoning tasks even when verbal ability was controlled, suggesting the generality of reflectivity-impulsivity to reasoning problems in this sample. It appeared that the impulsive subject responded quickly in situations where inferences were required - he seemed to report the first reasonable idea that occurred to him. Kagan, Pearson and Welch (op.cit.) suggested two explanations for the impulsive child's failure to censor or evaluate his quality of inferences: a) he might have had difficulty placing effective inhibitions on tendencies towards action, or b) he might have found it hard to block the urge to blurt out an answer even though he was not sure it was correct and even though he would like to be correct.

In order to investigate differences in strategy between reflective and impulsive children, Adams (1973) constructed a marble game with a panel containing three knobs. If the child pushed the "correct" knob he was rewarded with a marble - each subject had 80 trials, with a 33% randomised reward system operating. Four different strategies were analysed: 1) perseveration (repeated choosing of same knob); 2) patterned sequence guessing (following right, middle, left, for example); 3) win-stay (selecting the same knob once it was rewarded); and 4) lose-shift (selecting a different knob when it was not rewarded.) Adams found that younger (six year old) impulsives made more "correct" responses than all other groups, younger (six year old) reflectives made more patterned responses than the others, younger impulsives gave

more win-stay responses, impulsives (irrespective of age) gave more correct responses, and reflectives (again irrespective of age) showed more lose-shift behaviour than impulsives, but only in the first half of the trials. There was one significant age effect in that younger subjects gave more correct responses. Adams' overall conclusion was that impulsives showed a more immature response strategy than reflectives at six years of age but this did not occur at the age of 8. It seems that the experiment may have been too simple for 8 year olds and it did not allow much intersubject variability. Furthermore the sample was somewhat small (total of 40) inasmuch as it was covering both sexes and two age groups.

Four different decision-making tasks were used by Mann (1973). There were: 1) toy decision; here each child was first asked to choose the one toy he preferred most, then he was offered to keep his 3rd or 4th choice; 2) Mischel decisions; two items were taken from Mischel (1966) on the delay of gratification: a) choice between one sweet today or two tomorrow, and b) choice between one pencil top today or two tomorrow; 3) Toss the cat: the child was offered the chance to win or lose a large amount by setting a very difficult goal or win or lose a small amount by setting a modest goal - the task being to throw a toy cat into a box from 2, 4, 6, 8 or 10 feet; 5) word decisions; the child was asked to choose between different categories or words to spell where a wrong response would lead to the loss of a lollipop.

With a total sample of 63, again covering both sexes and two age groups (35 six year olds, 22 male, 13 female and 28 eight year olds, 13 male, 15 female) Mann found that on the first task (toy decision) six year old reflectives were the slowest to choose, six year old impulsives the quickest, with eight year old impulsives and reflectives in between (ignoring age the reflectives were slower); on the second

task (Mischel decisions) there were no significant differences; on the third test (Toss the Cat), the reflectives were slower in choosing the distance to throw from, with no age effects; and on the fourth task (word decisions) again the reflectives were slower, but six year olds in general took longer than the eight year olds, contrary to expectation.

Kagan and Messer (1975) cited Mann's experiment as showing that where response uncertainty is maximised, reflective children take more time. However, Block, Block and Harrington (1975) pointed out strongly the anomalous final finding reported above, since it was generally held that reflectivity increased with age, and they criticised Mann for not evaluating the respective contributions of accuracy and response times to the relationships found to see whether an interpretation in terms of such concepts as "adaptiveness-maladaptiveness" or intelligence or competency or "ego-resiliency" better fitted the results. (Mann could have responded that this simply was not the brief he set himself.)

Problem solving strategies involving the twenty questions game (Mosher and Hornsby, 1966) have been examined by several researchers. Ault (1973), for example, used the M.F.F. test to divide her sample of 1st, 3rd and 5th graders (mean ages 6 years 7 months, 8 years 8 months, 10 years 9 months respectively) into four groups - reflective (slow/accurate), impulsive (fast/inaccurate), fast/accurate and slow/inaccurate, with, in each category, 59, 58, 26 and 23 children of both sexes across the three age ranges. She found that, overall, younger reflectives obtained similar scores on the game to the older impulsives, with impulsives of all three ages asking questions of a less mature cognitive strategy than reflectives or fast-accurates. Ault defined more mature strategies as 1) non-perceptual questions (is it a fruit, does it grow on trees?), 2) extrinsic questions (is it in this column/

row?) or 3) compelled specific hypotheses (any question naming one picture when only two or three remained), whereas less mature strategies were defined as: 1) uncompelled specific hypotheses (naming one picture when four or more remained), 2) pseudoquestions (is it green with a flower on it? - that is, either perceptual or non-perceptual but applying to one picture only) or 3) perceptual questions (is it blue, does it have a tail?).

A similar result was obtained by Denney (1973) who also used the 20 questions format. He found that seven to eight year old children classified as reflective were more likely to ask more constraint-seeking questions, that is ones which were more general and eliminated several alternatives simultaneously. (It should be mentioned that Denney classified his subjects as impulsive or reflective on the basis of time alone.) McKinney (1973) also found that reflective subjects tend to use more efficient (general) hypothesis-testing strategies, whereas impulsives use specific hypotheses and trial and error.

With an analogous reasoning test Achenbach (1969) found that reflectives were more likely to select alternatives on the basis of analogy than impulsives who responded on the basis of association. For example, in the item "5 is to number, as black is to -", reflectives tended to respond "colour", but impulsives "white".

The above example is of course similar to the sorts of items used in traditional intelligence tests, and intelligence is one factor to be considered in all M.F.F. studies. Both Kagan (1965c) and Lewis (1968) have found response time latencies on the M.F.F. to be unrelated to general intelligence or verbal ability, although M.F.F. errors tend to have a low negative correlation. Therefore, if both time and errors are used in the classification of reflective/impulsive, then one might expect the reflective group to have a slightly higher score on

intelligence tests. This is just what transpired when Meichenbaum and Goodman (1969) examined 30 five year old children. Their reflective group had a mean I.Q. of 126 and the impulsive group 110 (measured on the Primary Mental Abilities Test (Thurstone, 1962)). Of course Thurstone's Test measures such factors as perceptual speed, verbal meaning, number facility and spatial ability, so that the M.F.F. and P.M.A are similar in that with both tests the child has to select the correct answer from an array of alternative pictures.

It may well be that the differences between reflectives and impulsives are associated with the way in which they actually scan the test items with their eyes. When Drake (1970) examined a sample of 18 eight-to-nine year olds (6 boys, 12 girls), dividing into reflective/impulsive on the basis of time only, she found that during the first six seconds of looking reflective children allocated significantly more time in looking to the standard, and by the time a response was made reflective children had looked at a significantly larger portion of the stimulus figures, and in greater detail, than impulsives. Furthermore, reflectives made twice as many comparisons between or among homologous parts of different figures. Hence it would seem that reflectives do not simply duplicate or continue the impulsives' strategy, they use different strategies. The reflectives gather information more carefully than impulsives, who make a decision before much evidence is in and are less concerned with re-checking the data; therefore, the impulsive child is not simply a faster thinker than the reflective.

Ault, Crawford and Jeffrey (1972) also looked at visual scanning strategies with 29 nine year olds, and found that reflective and fast-accurate subjects were more systematic and made a greater proportion of comparisons between either the standard and a variant or between two variants than impulsives or slow-inaccurate children. The important

criterion then appeared to be M.F.F. errors since the more accurate children on the M.F.F. were the more systematic, a finding which agrees with common sense. (This may be related to the finding of Vurpillot (1968) whose examination of eye movement data suggested that young children (4/5 years of age) answer after comparing on only a few features compared with nine year olds. Of course if the visual search is hasty then minor differences between variants are easily overlooked and there are frequent errors.)

A similar result was obtained by Siegelman (1969) who found that, with 65 nine year olds, reflectives had higher mean scores on all measures of frequency and duration of looking behaviour, and they also spent more time looking at the chosen alternative than the standard. Impulsives ignored $2\frac{1}{2}$ times as many alternatives as reflectives, suggesting to her "a more biased and more peaked distribution of attention." (It should be mentioned again that Siegelman used a mechanised form of the M.F.F. with the position of the stimuli altered and their size reduced from the original version.)

Slightly contradictory findings were reported by Zelinker et al. (1972), however, when they looked at 31 nine year olds. They concluded that the differences between reflectives and impulsives with regard to duration of fixation and percentage of fixations on the standard were not statistically significant. As with Siegelman (op cit.) they found that attention was an important differentiating factor. When they employed a reaction time task with variable preparatory time intervals, with long time intervals the impulsives actually had longer reaction times than reflectives, the authors suggesting that this indicated "the poorer ability of impulsive subjects to sustain attention."

After the administration of the M.F.F., Zelinker and his colleagues gave a variation called Differentiating Familiar Figures using the same

standard figures as the M.F.F. but with only one of the six variants being different, followed by a third test employing a second set of Kagan-type figures. On the Differentiating task both impulsives and reflectives showed a decrease in the percentage of fixations on the standard and an increase in the systematic comparison of the variants. This modified strategy then transferred to the third task for impulsives only - they made fewer errors compared with the first test although their response latencies were as short as the first time. Of course this could have been simply due to practice or improved 'mental set', and moreover, since the reflectives made relatively few errors on the first administration, it would have been extremely difficult, if not impossible, to have made even fewer errors, to a statistically significant degree, on a later administration.

More overt behaviour has also been examined in order to see if reflectivity-impulsivity generalised, and one method used has been to obtain ratings of children's classroom behaviour by their teachers or by themselves. Nadeau (1968) for example asked teachers to rate a sample of 108 nursery school boys on twelve personality characteristics derived from descriptions of reflective and impulsive children given in Kagan, Moss and Sigel (1963).

No relationship at all was found between the teachers' ratings of impulsivity and M.F.F. latencies, errors or a combined factor of them. Ault, Crawford and Jeffrey (1972), on the other hand, obtained teacher ratings on a sample of 14 girls and 15 boys, median age 9 years 2 months, and found that reflectives were rated as a whole highly attentive, boys were rated more hyperactive than girls regardless of M.F.F. classification and all groups were seen as equally motivated. With a double median split operated on this small sample it is no surprise that the hyperactivity findings and M.F.F. classification were confounded with

sex since no boy was classified as fast/accurate, only two girls were classified impulsive and a further two slow-inaccurate.

Taking the ratings a step further, Bentler and McClain (1976) obtained ratings on reflectivity-impulsivity by the children themselves, by their peers and their teachers. Their sample comprised 5th graders (35 boys, 33 girls) and ratings were also obtained on academic achievement motivation, test anxiety and extraversion. In a multiple regression analysis, M.F.F. variables and a combined factor of them were related to the above ratings: rated impulsivity had near-zero correlations with each M.F.F. variable. The only statistically significant correlation was between M.F.F. errors and peer ratings of extraversion ($r = -0.26$), which as the authors themselves admit, "must be treated as a chance result".

A similar fate met Cairns and Harbison (1975) who carried out a two-way analysis of variance with data from the M.F.F. and the J.E.P.I., the subjects being 98 boys aged 11 - 12. No main effects or interactions were observed. In explanation they suggest that self-reports were invalid, including the J.E.P.I. In fact Kagan et al. (1966) had already stated that impulsive children take less time to decide about self-evaluation statements, so that their self-ratings or self-descriptions "may be less accurate."

Block, Block and Harrington (1974) did find a relationship between M.F.F. accuracy and a Q-sort item dealing with "being reflective, thinking and deliberating before speaking or acting", although they preferred to interpret their data in terms of "ego-resiliency" and anxiety, rather than impulsivity-reflectivity which the item also appears to define.

Keogh (1971) has argued that the hyperactive child is an extreme example of an impulsive child, and one would therefore expect a link in

the classroom between teacher ratings of hyperactivity and impulsivity as classified by M.F.F. Sergeant, van Velthoven and Virginia (1979) investigated just this with 106 Dutch-born ten year olds of working class parents, adding a further evaluation of hyperactivity by having two independent judges rate the subjects when viewed on video recordings. No significant relationships between M.F.F. variables and either rating of hyperactivity were found. The authors excused this result by stating that the experimental situation did not reflect the "social element" of the classroom, which may be a necessary condition for behaviour such as impulsivity to be exhibited.

Hyperactivity is considered to be one factor sometimes contributing to emotional disturbance, and this area was investigated with regard to reflection-impulsivity by Finch, Pezzutti, Montgomery and Kemp (1974) in children admitted to a "short-term residential treatment facility". With thirty subjects, aged twelve and matched on Mental Age derived from P.P.V.T. scores, they found that although reflectives did not differ from impulsives on chronological age, mental age or academic achievement (Peabody Individual Achievement Test or California Achievement Test), impulsives had been placed by their teachers on average two grades lower than reflectives. The authors suggest that perhaps impulsive children exhibit behaviour which is more likely to result in expulsion from school followed by being demoted a grade, although one would expect lower attainments to result because of the enforced absence from school. Another suggestion is that impulsives are less likely to complete homework assignments and therefore receive failing grades. However, it is possible that promotion and demotion is related to manageability within the class and that manageability is itself related to reflection-impulsivity. For example, Montgomery and Finch (1975) found that emotionally disturbed children were more likely to be rated

by teachers as exhibiting externalisation of conflict (disobedience, rebelliousness, refusal to obey rules, irresponsibility) if they were classified as having an impulsive cognitive style, and as exhibiting internalisation of conflict (self-consciousness, withdrawal, shyness, nervousness) if they were classified reflective. This finding confirms similar results reported by Weintraub (1968).

Although Finch et al. (op.cit.) found that there was no difference between reflectives and impulsives on measures of academic achievement, there was a statistically significant correlation between M.F.F. errors and achievement over the whole sample of -0.33 ($p < 0.01$). M.F.F. response latencies correlated with achievement $+0.15$ but not significantly ($p > 0.05$). However, this was with a sample of emotionally disturbed children and it is important to return now to normal children.

Teachers generally regard reading as the main area of achievement to be considered, and Kagan (1965c) examined this factor with regard to the M.F.F. factors. Kagan claimed that when a child is confronted with a new word to read he is in fact meeting a discrimination problem containing a high degree of response uncertainty, as in the M.F.F. In this situation there are clearly several possibilities of solution for the child who may or may not delay before responding. Kagan's sample comprised 130 six to seven-year olds who were given the W.I.S.C. Information and Vocabulary subtests (to provide an assessment of verbal ability), a word recognition test and a letter recognition test, in addition to the M.F.F. In the word test the child had to select from a visual display of five words the one the experimenter spoke, whereas in the letter test the child had to state what each letter said, the 26 letters of the alphabet all being presented one at a time in random order. Time to first response and errors were recorded on the former test, and errors only on the latter.

The results indicated a statistically significant correlation between reflectivity and word recognition accuracy even when verbal ability was partialled out. When the differences between high and low verbal ability children were looked at, then reflection-impulsivity failed to discriminate. It would seem that with a child who has minimal reading ability and low verbal ability no solution hypotheses are forthcoming and it does not matter whether you are impulsive or reflective. With letter recognition there was only one significant finding, a negative correlation between M.F.F. response time and errors on letter recognition by low verbal ability boys.

Kagan concludes that the reflectivity-impulsivity dimension is most relevant at the intermediate stage of mastery of reading. When the child has no reading skills then no solution hypotheses are generated; when the child can read then there is no delay in responding.

The relationship with reading ability was also examined by Cook (1977) in a sample of 20 children from an E.S.N.(M) school and 20 from an ordinary school, the children's ages ranging from 10 to 12 years. In the ordinary group there was a significant relationship between M.F.F. response latencies and reading age, but no such relationship existed in the E.S.N.(M) group. When the two groups were pooled, however, several significant correlations emerged (all at the 1% level of significance). Firstly, longer response latencies related to higher reading ages even when the "intelligence" (as measured by the E.P.V.T.) was partialled out; secondly, few errors on the M.F.F. correlated with higher reading ages (+0.44) and with high scores on the E.P.V.T. (+0.47). However, reading ages and E.P.V.T. scores themselves correlated at +0.81. Thirdly, reflectives in general had higher reading ages and higher E.P.V.T. scores. The most interesting finding was that the E.S.N.(M) children were far more impulsive than the ordinary children,

which may again relate to social manageability (cf. Finch et al. and Montgomery and Finch, above) since it is well known that slow-learning children who show disturbing behaviour are more likely to be placed in an E.S.N.(M) school than slow learning children not showing such behaviour.

Cook's study can be criticised, however, for its over-reliance on simple statistics (t-tests throughout with a few product-moment correlations), its using the E.P.V.T. as a measure of "intelligence", and the unevenness of the sex distribution of the sample. There were only 11 girls in the whole study (4 E.S.N.(M), 7 ordinary) so that the results may be more representative of boys than girls, and the paucity of numbers also prevented any statistical treatment of sex differences, which is important in view of the reported tendency of girls to be more reflective than boys (Messer, 1976) and the fact that boys tend to have more reading difficulties than girls.

Reading was also examined by Roberts (1979) in her study of top infants averaging seven years of age. She found that considerably more of her sample of poor readers (n = 42) were found to be impulsive than her sample of normal children (n = 70); in fact over one third of the poor readers fell into the highest error quartile and lowest time quartile. Again there was noted the tendency for girls to be more reflective than boys.

The part played by anxiety has also been the subject of a number of investigations. The child who is anxious about his ability and expects to fail may be unable to tolerate the period of silence that accompanies his choosing which response to make. He may fear that the silence will be seen as an indication that he cannot provide the correct answer immediately, and in order to reduce this tension he may offer an answer impulsively. The child who is not anxious about his ability will not

fear the possibility that the experimenter will disapprove of him and will be more able to tolerate the delay between the presentation of the problem and his answer. Delay may be facilitated when a child expects success, as this helps him tolerate the silence better. Alternatively, the more apprehensive the child is, the more difficult he might find it to venture an answer and therefore the more likely he is to be reflective. Age would seem to be an important variable here. There is some evidence (Mussen, Conger and Kagan, 1979) that American children at least become more reflective as they grow older; Draguns and Multari (1961) suggest that this is related to the tendency of American children to grow more cautious as they get older and to become more concerned with avoiding error.

There are basically two incompatible demands imposed by society, argues Kagan (1965a) - get the answer quickly and do not make a mistake. (Much as in conventional intelligence tests for example, where it is the combination of speed and power which counts.) In the M.F.F. test the two demands are mutually exclusive, he claims, although some researches have shown that some children, albeit small in number, manage to be both fast and accurate in their performance. Kagan (1966) suggests that the child is pulled by two forces, analogous to an approach-avoidance conflict. If the strength of the approach gradient is stronger (seek quick success) the child will respond impulsively; if the strength of the avoidance gradient is stronger (anxiety over making a possible mistake) then the child will respond reflectively.

It is interesting to note that in 1964 Kagan et al. had hypothesised that the anxious child would be unable to tolerate the discomfort evoked by delay and would therefore respond impulsively on the M.F.F. A year later Kagan (1965a) in a longitudinal study of 75 children, found that it was the reflective child who displayed anxiety in social

and educational settings; for example the reflective children tended to avoid peer-group interaction and initially display strong anxiety in strange situations, they tended to watch before joining in and retreat to solitary tasks. In 1966 Kagan repeated his view that it was the reflective child who was the more anxious and in 1970 expanded this by stating that the greater the fear of (or anxiety about) making an error, the more reflectively and cautiously the child performed. Minimal anxiety over a possibly inaccurate answer is likely to be a primary determinant of impulsive performance. He suggested that the reflective child was over-concerned with making mistakes and wished to avoid error at all costs, whereas the impulsive child was minimally apprehensive about errors and responded quickly.

However, Ward (1968) claimed to obtain contradictory findings to those of Kagan in his investigations with kindergarten children (mean age 5 years 9 months). Using the meaningful (that is non-geometric) figures from the M.F.F. test and a similar test taking both geometric and meaningful figures from Scale 1 of Cattell's Culture Free Intelligence Test, he found that, after making an error, 86% of impulsives had longer response latencies on the next item with the M.F.F. test, and 74% of impulsives on the Cattellian figures. The reflectives also took longer as a whole but not to a statistically significant degree. According to Ward, if Kagan's idea is that the impulsive child is anxious over the possibility of failure then impulsives should become more impulsive when accuracy is stressed, whereas he found the opposite. In fact Ward was contradicting Kagan's 1964 position, but supporting Kagan's 1966 and 1970 views! It is interesting to note that Ward considered the standard administration of the M.F.F. to be stressful to the child with its timed nature and feedback of error. Ward did concede that the longer response latencies could have been due to a greater involvement

and a desire to do well on intellectual tasks. The overall conclusion was that "situational variables as well as factors intrinsic to the child play a role in effecting reflective or impulsive performance".

A further confirmatory study of the fact that anxiety over intellectual performance leads to increased reflectivity (longer response times and fewer errors) was provided by Messer (1970). With a sample of 60 third graders (mean I.Q. 111 on the Kuhlmann-Anderson Test) Messer manipulated anxiety by giving a series of impossible anagrams where only three in ten had solutions or anagrams all of which were solvable as a control condition. Messer concluded that anxiety was one antecedent of a reflective disposition. When he later collaborated with Kagan (Kagan and Messer, 1975) the view was expressed that anxiety over making an error on a task believed to be solvable would lead to reflectivity.

It is time now to consider some of the misgivings expressed about the M.F.F. test as a measure of impulsivity-reflectivity. Block, Block and Harrington (1974, 1975) reported for example that their obtained correlation between response times and errors ($r = -0.33$) was rather lower than those quoted by Kagan ($r = -0.5$ to -0.6) Kagan and Messer (1975) rejoined that this was so because Block et al. had used a pre-school sample (mean age $4\frac{1}{2}$ years) and other pre-school samples had shown that the correlates of response time and errors were less salient in this age range than the correlates of errors alone. This is despite the claim by Mussen, Conger and Kagan (1979) that children below five years of age are not concerned with avoiding error. Unfortunately neither Block, Block and Harrington nor Kagan and Messer have been able to clarify whether any increasing, age-related correlation represents some significant developmental change or whether "it simply reflects the psychometric consequences of lower test reliability at younger ages"

(Bentler and McClain, 1976).

Methodological problems were noted by Ault, Mitchell and Hartman (1976) who calculated that when a double median split is used for classifying subjects there may be an error of 24%, which would clearly have dire consequences for small samples. Bentler and McClain (1976) reinforced this criticism of the median split by adding that it resulted in a loss of discrimination associated with assuming all children in a given quadrant have identical scores, the errors of classification would magnify random differences in scores, the dependency on sample medians could lead to arbitrary groupings, the procedure discarded many subjects, the procedure assumed a non-linear model of the kind that typically tends not to cross-validate, and it made determining reliability difficult since the reliability of the two M.F.F. variables cannot be translated directly into a reliability of classification. Their solution to this problem was to calculate a "new variable" score (M.F.F. R-I) based on the sum of standard scores of a child on the two M.F.F. variables keyed for reflectivity, although they had to use the sample mean and standard deviation instead of the population mean and S.D. This they claimed represented a linear combination rather than the nonlinear advocated by Kagan but at least it did not discard any subjects.

Ault and her colleagues (1976 op.cit.) went further and stated that the moderate negative correlation typically found between time latencies and errors made the 2 x 2 analysis of variance on latencies and errors "problematic", since the main and interaction effects resulting from such analyses may be confounded, and the artificial dichotomisation of continuous variables (e.g. latency and errors) results in loss of statistical power. Instead of univariate statistics they advocated the use of multiple regression or multiple variance analyses.

At a different level, Kagan's work can be criticised on the grounds that he confuses causes with mere antecedents, falling into the "post hoc ergo propter hoc" type of trap, and he uses labels to "explain" other labels. For example, he seeks to answer the question "why is a child impulsive or reflective?" by giving the antecedent behaviour of children later classified as impulsive or reflective and implying a causal relationship between the two. Furthermore, he looks for other answers by finding other descriptions of behaviour, using the later set of verbal tags to mysteriously explain the earlier verbal labels, indulging in the form of tautology that runs "the child fails to consider alternatives because he is impulsive." It is tautologous because the label impulsive is simply applied to describe that very failure to look at alternative hypotheses. Similarly, a person who acts aggressively, impulsively and without conscience may be labelled psychopathic - he does not so act because he is psychopathic; the label is merely a description of the behaviour.

In summary one has to conclude that children can be divided into two groups labelled reflective and impulsive, the former taking their time before responding to a problem and being more accurate when they do respond, and the latter taking little time to consider the problem or their answers and making more errors. This difference is most clear at the age of 5 - 6 years but is applicable only to particular problem situations (for example, where there are several equally attractive response hypotheses, the correct answer is not immediately obvious and the child understands the nature of the problem). With increasing age it seems that children make fewer errors but take longer to respond (that is, become more reflective).

Whatever the reasons for this particular differentiation of cognitive style, it appears to have withstood the test of time so far, and accords with teachers' experiences within the classroom.

4. OBSESSIONALITY : PSYCHOMETRIC STUDIES.

In order to assess the obsessional character or personality, some form of objective measure is needed. A number of attempts have been made in the past to do just this, and the present chapter looks at six in particular. They are as follows:-

- (a) Dynamic Personality Inventory (Grygier 1961).
- (b) Sandler-Hazari Obsessionality Inventory (Sandler and Hazari 1960).
- (c) Leyton Obsessional Inventory (Cooper 1970).
- (d) Crown-Crisp Experiential Index (Crown and Crisp 1979).
- (e) The Blacky Pictures (Blum 1949).
- (f) Ai3Q (Kline 1971).

(a) The Dynamic Personality Inventory.

The D.P.I. (Grygier 1961) merits our consideration here because it sets out to provide measures of 33 personality dimensions, of which six are specifically anal. The test was generally inspired by Freud and his followers, and makes extensive use of psychoanalytic terminology, but it owes a special debt to the father-daughter partnership of Krout and Tabin (1954), who first constructed the Krout Personal Preference Scale (K.P.P.S.). It therefore behoves us first to look at the K.P.P.S.

The Krouts' inventory comprised ten scales, following more modern psychoanalytic theory. Each scale consisted of ten items, to each of which the subject had to indicate his like, dislike or indifference. This three point scale was in fact contained only in the 1951 version, the 1947 variant having a five point scale. Of interest to us here are the two anal scales, one early anal (or anal expulsive), the other late anal (or anal retentive).

The individual items for test IV (early anal) were as follows:
"1) leaving things where they are, 2) odour of kerosene, 3) mixing paints, 4) odour of manure on fields, 5) giving things away, 6) sound of the bass violin, 7) making deposits, 8) letting others clean up after your work, 9) odour of tar, and 10) sound of the tuba."
There was an intended emphasis on a carefree attitude to possessions and both pungent odours and bass-sounds (referred to as "gas-expulsive" by the authors). A high score depicted emotional lability, self-indulgence, an easy-going attitude and high frustration-tolerance, whereas a low score implied a lack of early anal indulgences and strong positive controls, resulting in emotional rigidity, neatness, punctuality and an uncompromising nature.

The items for test V (late anal) were: 1) proof-reading,

2) firmness of decision (on the subject's part), 3) swatting flies, 4) checking and re-checking for errors, 5) prosecuting offenders, 6) taking extreme care to preserve clothes, 7) classifying postage stamps, 8) being obstinate, 9) "chewing down the price", and 10) seeking perfection. These items were designed to emphasise the well-known Freudian triad of orderliness, obstinacy and stinginess. A high score implied efficiency and an exacting nature, "strong character" traits, with "extremely high" scores indicating avarice and mistrust. A low score indicated generosity but inconsistency, adaptability but with poor work habits.

The main evidence for the validity of all ten scales rested on face validity. However, some other evidence is also called forth by Krout and Tabin (1954), in that they show that the K.P.P.S. is independent of the Bell Adjustment Inventory (Bell 1938), although, as Kline (1972) points out, so is intelligence unrelated; there are reported some differences among 14 pairs of twins (described as "anecdotal" by Kline) and there are some differences between samples of normals and "neurotics" (unspecified), for example the late anal scale (test V) differentiated normal and neurotic at better than the 0.1% level (neurotics having the lower scores). In view of this relatively insubstantial evidence it is somewhat surprising to find Kline (1972) concluding that "these validity studies support the validity of the K.P.P.S. and thus the existence of the psychosexual personality syndromes" (p.16).

Grygier (1961) used the K.P.P.S. as the springboard for his own test, the D.P.I. which was specifically aimed at measuring "tendencies, sublimations, reaction-formations and defence-mechanisms associated with the various patterns of psychosexual development". Grygier and Grygier (1976) likened their test to a word association task in that the subject is instructed to "give free rein to his imagination"

and mark his reactions to the 325 items in terms of like or dislike according to his first reaction.

It is appropriate at this stage to detail the six anal scales together with the specific items on each one.

1. Ah : hoarding : possessiveness and a tendency to hoard objects and to save money; indirectly, persistence of effort and tendency to plan ahead.

Like items :

- 26) unwrapping parcels carefully to save paper or string.
- 89) collecting stamps.
- 126) keeping your receipts long after you have paid the bills.
- 163) keeping old things in case you need them one day.
- 209) saving boxes or medicine bottles.
- 212) collecting books, journals or magazines.
- 214) collecting coins.
- 288) collecting postcards of your holidays.
- 296) keeping a large stock of canned goods in your cupboard.

Dislike item : 124) spending money on passing pleasures.

2. Ad : attention to detail : orderliness, conscientiousness, and perfectionism.

All like items:

- 53) working steadily rather than fast.
- 82) insisting on perfection.
- 96) planning your work.
- 109) arranging objects in perfect order.
- 164) being rather particular about small details.
- 183) checking your letters for errors before you post them.

- 205) doubting your efforts after criticism.
- 210) paying debts before they are due.
- 213) taking most things seriously.
- 258) attending personally to details.
- 263) work which must be exact in every detail.
- 300) conscientious performance of petty duties.

3. Ac : conservatism : rigidity and a tendency to uphold traditions and to follow routines.

- Like items :
- 48) keeping to your own class of people.
 - 53) working steadily rather than fast.
 - 147) people with very upright moral standards.
 - 175) staying in the same surroundings : same people, places, shops, food, work and play.
 - 286) keeping out of trouble as much as you can.
 - 298) a well-ordered way of life.
 - 325) peace and contentment as the main goals of life.

- Dislike items :
- 7) changing your mind quickly.
 - 45) changing your job.
 - 47) departing from accepted routine.
 - 231) working on new ideas which may prove to have no practical value.

4. Aa : submissiveness to authority.

- All like items :
- 59) complete and unquestioning respect for one's parents.
 - 109) arranging objects in perfect order.
 - 127) being very strict about right and wrong.
 - 143) demanding justice.
 - 165) the honour of your country above everything.

4. Aa : submissiveness to authority cont'd..

All like items: 184) obedience and respect for authority.

215) wearing uniform.

225) serving one's country as the highest ideal.

5. As : insistence on law and order : disciplinarian attitude.

All like items: 11) enforcing the law.

30) whipping as a punishment for serious offences.

77) making others obey.

148) strict immigration laws.

237) maintaining discipline and order.

278) having offenders prosecuted.

293) strict observance of rules.

308) severe penalties for improper conduct.

6. Ai : insularity : reserve, mistrust and prejudice, "paranoid attitudes", hostility.

All like items: 32) keeping to yourself.

36) being on your guard with strangers.

48) keeping to your own class of people.

70) a high wall around your garden or home.

135) keeping all foreigners out of government jobs.

148) strict immigration laws.

267) keeping others at a distance.

310) trusting people too little rather than too much.

Dislike items: 92) admitting coloured people to higher professions.

122) working with people from all walks of life.

198) a family of a different race moving in next door.

6. Ai : insularity: reserve, mistrust and prejudiced, "paranoid attitudes", hostility. cont'd..

- Dislike items:
- 214) people who go to prison for their beliefs.
 - 249) marriages between people of different national background.
 - 261) working alongside people of lower social class.
 - 304) working with coloured people in your job.
 - 316) confiding in your friends when you are in trouble.

It can thus be seen that there is a considerable degree of face validity for the inventory, although Cattell and Kline (1977) refer to the "bizarre nature" and "curious flavour" of the items, whereas Sells (1965) merely describes the items as "novel".

During the standardisation Grygier and Grygier (op.cit.) carried out a number of correlational studies, one of which is quoted in full in tabular form. The authors concede that in the matrix some 52 correlations could prove significant by chance alone and add that some correlations might be expected NOT to reach significance despite an existing general relationship. This would appear to give the authors exceptional leeway in accounting for their results. Out of four correlation matrices, if three proved significant in the same direction and the fourth did not, then the authors claimed that the relationship was probably true but "by chance" was not reflected in that particular matrix. They do not appear to entertain the possibility that perhaps in some populations the relationship might not actually exist and that chance may have little to do with it. This is despite the emphasis by Stringer (1976), in the Manual to the D.P.I., that "there is no such thing as the factorial structure of the D.P.I., or

indeed, of any test" since it is the responses to the test items which are dealt with in factor analysis and correlations, not the items or scales themselves. Therefore it is natural that the factorial structure will change when different populations are being examined. Furthermore, as Stringer (op.cit.) again stresses, it is "in the nature of the factorial technique to bring clarity at the expense of errors of measurement". With different populations, therefore, different information is used and different sets of data are in effect suppressed. Even when the same population is tested twice, both mean scale scores and the factorial structure alter.

It is also interesting to note that the authors state at the outset that "one cannot expect too much security using numerical devices" and, further, that "it is certainly better not to use statistics at all than to assume that every statement is true if the probability of its being so exceeds 95 per cent, but not if it drops to 94"

(Grygier and Grygier 1976, p.6) However, they then go on to use the conventional level of 5% to decide whether correlations are significant or not, instead of perhaps giving actual probability levels which would have been more in keeping with their criticism of "numerical devices". One either has to keep to convention or purposely steer clear of it - one cannot have it both ways.

From their correlational data it is clear that the anal scales inter-relate to a degree; the authors claim that the scales therefore constitute an "anal character" behaviour pattern. The significant ($p < 0.05$) relationships are as follows.

1) Ah (hoarding) correlates positively with Ad (attention to detail) and negatively with Oi (impulsiveness). In males only there is a positive correlation with tactile and handicraft interests, indicated by the authors to show that men who like handiwork tend to be obsessional.

Inasmuch as Ah also refers to persistence of effort and the tendency to plan ahead, the negative relationship with impulsiveness and spontaneity is readily explained.

2) Ad (attention to detail) correlates positively with Ah (hoarding), Ac (conservatism) Aa (submissiveness to authority), As (disciplinarianism). H (social conformity), and EP (Persistence). There was a positive correlation (in men only) with handicraft (as above) and (in women only) with taking care of one's appearance (Ph). The association with H (social conformity) may relate to the item overlap (all H items being taken from other scales including four of the anal ones) or the lack of control of social desirability. The female-only relationship appears easy to explain since both Ad and Ph involve attending to detail, the latter scale simply relating more to oneself.

3) Ac (conservatism) has positive correlations with H, Ad, Aa (all as above) and Od (emotional dependence). There are negative relationships with Om (need for movement and change), Ou (unconventionality), Pa (drive for achievement), S (freedom from sexual repression) and E1 (initiative and decisiveness). With male samples only there is again the relationship with handicraft interests. The conservative type could be expected to be more dependent in the sense of wanting to stay in the same surroundings, wanting peace and contentment and liking people with upright moral standards (Ac items 175, 325, 147). He or she would also not want change, be conventional, not seek for achievement, lack initiative and at least be sexually unadventurous if not repressed. Thus all the intercorrelations are in the appropriate directions and meaningful.

4) Aa (submissiveness to authority) correlates positively with H, Ad, Ac, As and Ai (the anal group hanging together, as well as maintaining the social conformity link), and negatively with Ou (unconventionality) and S (freedom from sexual repression). These

relationships are again meaningful (as above), with lack of sexuality and conventionality relating to strict ideas of right and wrong, having complete and unquestioning respect for one's parents, and liking obedience and respect for authority (Aa items 127, 59, 184).

5) As (insistence on law and order) is similar to above (Aa) in correlating with H, Ad, Aa and Ai positively, and negatively with S.

6) Ai (insularity) correlates only with Aa and As positively at a significant level, although there is a high proportion (47 out of 64 possible) of low negative correlations not achieving significance.

The authors comment that this may reflect "the rejecting and negative attitudes" measured by this scale.

Stringer (1976) produced factor solutions, with five separate populations, employing both orthogonal rotations (Varimax) and oblique rotation to simple structure. His samples were as follows:

- 1) 438 male candidates for admission to an English university school of architecture aged 18-19.
- 2) 294 male students of engineering, aged 18-20.
- 3) 283 female students of art, architecture or education, aged 17-23.
- 4) 271 male adults, aged 21-60, comprising four homosexual and two heterosexual groups.
- 5) 165 Canadian male first-offenders aged 16-24, tested before and after treatment.

With his first sample, the varimax and oblique rotations gave similar solutions. The six-factor solution included two anal factors:

- i) Aa, Ac, Ad, As, Ah, Od (emotional dependence) versus Ou (unconventionality), S (sexuality), Om (need for movement and change), Oi (impulsiveness).
- ii) Ai (insularity) versus Od and Sa (interest in social activities).

In an eleven-factor solution, the first of the above factors

splits into two:

ia) Aa, As, Ac, Ad versus S, Ou, Om; and

ib) Oi versus Ad, Ac, Ah.

The second factor (ii above) does not subdivide further.

Stringer labels the first anal factor ((i) above) "generation Gap Syndrome" since on the one hand is represented conservatism and traditional values and beliefs, whilst on the other lie unconventionality, freedom from sexual repression and emotional independence, perhaps symbolic of "hippie" against Establishment groups, or older against younger generations.

The second factor ((ii) above) is labelled hostility-love since mistrust and prejudice are contrasted with a liking for people.

With the second sample the "Generation Gap Syndrome" factor also emerged, the anal scales also appearing in other factors, for example; Aggressive Unconventionality (Ac versus Om, Ov, Ou); Aggressive Exhibitionism (Ah versus Pe, SA, EI); Handling and Hoarding (Ah, Ad versus Oi); Obsessionality and Persistence (Ad, Od, EP) and Insularity (Ai) - these latter three only occurring with this sample and with factor solutions greater than six. Stringer suggests that these specific factors highlight the differences between engineering and architectural students.

In the third, female, sample, the "Generation Gap" and Hostility-Love factors again emerge, together with a new factor labelled "self-expression versus constriction" and comprising Ac, Ad versus Om, Oi, Ou (ignoring loadings below 0.4).

For our purposes here the other two samples, being specific clinical groups, will not be discussed, since it is primarily with normal groups that we are concerned. The important findings are that the anal scales hang together, with the exception of Ai, in the

bipolar factor of the "Generation Gap Syndrome", and Ac consistently contrasts with Om, Ov, Ou, Oi, both factors being in the main oral-anal bipolar factors.

Grygier's (1961) claims for his test in terms of reliability, validity, lack of social desirability response control and stability are described by Sells (1965) as extravagant, in view of the fact that no supporting data were provided in the original manual. Data have, however, been forthcoming since the test's publication.

Kline (1968), for example, administered the DPI to 70 teacher-training students and subjected the results to a Varimax orthogonal factor analysis. This revealed eleven factors of which only the first was in accord with psychosexual theory - a factor labelled by Kline as anal or superego. The positive loadings were on hypocrisy, submission to authority, conservatism, attention to detail, hoarding, tendency to plan and masculine identification, with negative loadings on unconventionality and sexuality. Kline concluded that the construct validity of the D.P.I. was not high, but the anal scales "could be valid in that they were measuring a common factor". Hill (1976) commented that the scales must be factor pure in order to demonstrate the existence of the anal character, but Kline (1978) disagreed, since Grygier's anal scales did load on a common factor (anal) as well as on a number of unwanted ones, so that one could argue only that the anal scales were not a pure measure of the anal character, not that the anal character did not exist. Hill (1979) rejoined that since the only good measure of the common factor had loadings of five anal and five non-anal scales, the factor might or might not be the anal character.

Stringer (1970) also criticised Kline (1968) on a number of statistical points. Firstly, his sample size (70) was inadequate,

since a minimum standard in a validity-testing factor analysis, "where it is desirable to be as free as possible from sampling error in the correlation coefficients", is to have ten times as many subjects as variables (Kline had only twice as many). This point was conceded by Kline (1972). Secondly, a cut-off point of 0.3 to determine salient loadings was very generous, particularly with such a small sample. Stringer felt that this feature alone would lead one to expect ambiguous or uninterpretable results, and he himself chose a cut-off of 0.4 with larger samples in his own factorial studies. Thirdly, the Varimax rotation, being an orthogonal analysis, prevented second-order analysis, and in view of the "fallible measuring instruments" Kline should have aimed for cross-identification of factors. This point again was conceded by Cattell and Kline (1977) when they referred to the orthogonal analysis as a technical shortcoming.

Stringer (op.cit.) went on to reanalyse Kline's data using an oblique rotation to simple structure, which yielded eleven first-order factors and four second-orders. One first-order factor was labelled anal, with freedom from sexuality being opposed to anality. The positive loadings were on sexuality and orality, with negative loadings on submissiveness to authority, hoarding and hypocrisy (a non-anal scale). In fact two further anal scales loaded negatively below Stringer's 0.4 cut-off but above Kline's 0.3 : attention to detail and insistence on law and order. One second-order factor appeared to be an anal-oral bipolar factor, with negative loadings on all six anal scales and hypocrisy, and positive loadings on three oral scales. The fact that with both these factors orality is contrasted with anality has led Fontana (1978) to contend that Stringer's claims are over-optimistic since in Freudian theory anal

and oral fixations are often seen as related (cf, Abraham 1921).

With a second set of data gained from a sample of 357 male students aged 17-20, Stringer (1970) subjected the whole sample to a principal components analysis with oblique rotation to simple structure, and obtained eleven factors (again), this time three anal-oral bipolar factors and one anal (insularity/prejudice). The bipolar factors were : 1) sexuality and unconventionality versus submissiveness to order, insistence on order and hypocrisy: 2) independence versus conservatism, 3) hoarding and orderliness versus impulsiveness.

When Stringer subdivided his sample into five subsamples of 71 or 72 subjects and subjected the data to an orthogonal (varimax) rotation, in order to match Kline's (1968) procedures, he obtained one anal factor with each sample, although in one sample it was not a pure anal factor (four anal loadings but six others in the same direction). The other four factors were each oral-anal bipolar factors with similar loadings, the interesting thing being that in every case hypocrisy loaded with the anal scales. This is not so surprising when one examines the item content which includes respect for authority, making plans, enforcing the law, not spending money on passing pleasures. The nature of the amount of item overlap almost guarantees correlations between the subscales, a criticism also made by Bromley and Lewis (1976) although Grygier (1979) defended himself only by saying he knew of the deficiency but chose to ignore it, since to remove the overlap would shorten the scales and make them less reliable, or else the scales would have to be lengthened, with an increase in testing time and hence a loss of cooperation on the part of the subjects and a reduction in validity; it would result in the removal of items which clearly belonged to

more than one scale both meaningfully and statistically; it would alter the patterns of interdependence of the scales (making them less intelligible, he claimed), and it would also reinforce the assumption that samples of 'pure' (one scale) attitudes were more realistic than samples of complex ones. Emphasising these points, Grygier (1979) points to the Manual of the D.P.I. (Grygier and Grygier, 1976) which found that avoiding item overlap and combining scales resulted in "increased coefficients of stability but reduced internal consistency and sensitivity of the descriptive nuances".

Kline's (1968) conclusions were further criticised by Stringer (1976) on the grounds that (a) one solution based on one mixed sample could never define a test's structure, (b) the D.P.I. was not entirely based on the psychoanalytic model since it was more influenced by empirical data than any theory, and (c) that the purpose of the D.P.I. was to "present a meaningful and measurable personality picture, not to validate a theory". There is little argument about the first and third points, and the second may well be true, but Grygier (1961) did initially describe his test very much in psychoanalytic terminology (see page 2) although he later (1976, 1979) chose to play down the psychoanalytic origins despite retaining labels and descriptions belonging to that school of thought.

When Kline and Storey (1978) factored the D.P.I. with the 16PF (Cattell), EPI (Eysenck and Eysenck 1964), Gottheil Scale (Gottheil 1965) Lazare oral scale (Lazare 1966), Ai3Q (Kline 1971) and OPQ/00Q (Kline 1978b), a total of 60 scales, they only used a small sample (116 students with twelve older adults included for no obvious reason) claiming that Guilford (1954) allowed twice as many subjects as variables for a criterion of a sound factor analysis, despite Stringer's (1970) criticism above and Kline's (1972) apparent conceding of the

point. However, they did avoid an orthogonal analysis and carried out instead a Promax oblique rotation in which components with eigenvalues of greater than one were rotated. The first factor to emerge was clearly an anal or superego factor, with positive loadings on four D.P.I. anal scales, Kline's own Ai3Q, hypocrisy (D.P.I.), and G and Q3 (16PF). Negative loadings were on sexuality and unconventionality. Kline and Storey contended that this finding supports the validity of the anal scales of the D.P.I., refutes Hill's (1976) objections to the identification of Kline's (1968) factor as anal and in fact replicates Kline's (1968) finding of the anal factor.

(b) Sandler-Hazari Obsessionality Inventory.

This questionnaire was constructed by Sandler and Hazari (1960) by taking from the 867-item Tavistock Self-Assessment Inventory some 40 statements which were regarded as having reference to obsessive/compulsive character traits and symptoms. A factor analysis revealed two major factors described as "more or less unrelated" : (A) 16 items relating to the obsessional or anal-reactive character, defined as having "traits of character which conform to the possessor's ideal standards for himself", the person who is systematic, methodical, consistent, punctual and meticulous; and (b) 17 items classified as symptoms of obsessional neurosis, the person whose daily life is disturbed through the intrusion of unwanted thoughts and impulses into his or her conscious experience : trivia are memorised and persistent "bad" thoughts struggled with.

Although the two dimensions were orthogonal, Sandler and Hazari stated that this did not necessarily mean that some people would not show a combination of both. The distinction between traits and symptoms has been supported by a number of other writers,

such as Foulds and Caine (1958, 1959), Foulds (1961, 1965), Kline (1967c), Meares (1971), Slade (1974) and Fontana (1980). Kline (op.cit.) in fact described traits as ego-syntonic, regarded by the person as useful or valuable, and examples of successful ego-defence, whereas symptoms were ego-dystonic, a definite hindrance to normal life and the indication of a breakdown of defence mechanisms which could be the cause of committal to psychiatric care.

Traits and symptoms have often been confused, an illustration of this being in the criticism of Orme (1965) by both Kline (1967c) and Reed (1969). Orme had taken 13 'O' factor items from Cattell's scales, verbally simplifying them to make an "emotional instability" scale, and also taken 13 items from the Tavistock Inventory (see Sandler and Hazari 1960) to make a separate obsessiveness scale. Both scales were then administered to a group of psychiatric patients with different diagnoses, and the results showed a positive correlation between the two. This led Orme to conclude that "the possession of obsessional traits is related to the admission of general emotional instability". Reed (1969) states that this cannot be accepted; it may be more acceptable to say that "the possession of obsessional symptoms" is so related; it would be even more acceptable to say that "the admission of obsessional symptoms is initially related to general instability". In further corroboration, Paykel and Prusoff (1973) point out that Orme's trait scale was in fact derived from Sandler and Hazari's second dimension of ego-alien phenomena and therefore related more to obsessional symptoms than to traits.

In the same paper (1969) Reed criticises Sandler and Hazari's (1960) questionnaire since it failed to discriminate between his three groups of in-patients: 20 obsessional state patients displaying

severe, classical symptoms: 20 patients of premorbid obsessional personality but without obsessional symptoms; and 20 non-obsessional controls (hysterics and personality disorders). This was so whether it was the A (trait) scale, the B (symptom) scale or the whole questionnaire which was used. Reed further claimed that the questionnaire was open to two types of acquiescence response set: 1) the subject is reluctant to admit the truth of any socially unacceptable statement about himself; and 2) the attention-seeking psychopath is wont to lay claim to every symptom suggested. As the original experimental group used by Sandler and Hazari was not differentiated ("the first 50 men and 50 women to complete the inventory" from a sample of 100 Tavistock Clinic outpatients with, presumably, mild forms of mental illness), they could also be criticised for not aiming at criterion validity.

Meares (1971) has suggested the Sandler-Hazari scales might in fact be over-sensitive, inasmuch as in a normal population they are likely to select people with either obsessional personalities or obsessional symptoms, whereas in a psychiatric population they may lose any such specificity. This would be in accord with Reed's (op.cit.) statement that the crude binary scoring might be misleading in that it provides information about the presence, but not the intensity, of experience or attitudes. It may therefore be that the Sandler-Hazari Inventory retains validity when used with (near) normal populations but not with samples having more severe disorders.

With a "normal", student population (96 psychology undergraduates aged 18-34) Liddell and Morgan (1978) found that obsessional symptoms (Sandler and Hazari's B scale) correlated at the 0.1% significance level with neuroticism (E.P.I.) whereas traits (A scale)

only correlated at the 5% level. However, traits and symptoms were not related to each other. Liddell (1976) had previously contended that Sandler and Hazari's B scale was more a measure of neuroticism than obsessiveness, but this is contradicted by her later view (Liddell and Morgan op.cit.) that "B-type items tap something different from neuroticism".

A variety of normal samples (teachers, students and lecturers) and one clinical sample were used by Fontana (1980) who adapted Sandler and Hazari's inventory by adding twenty-two buffer items to help prevent "faking good", and who also constructed a version for children with four buffer items. The results indicated that (1) his clinical sample of 30 regular attenders at a psychiatric hospital's day unit scored higher on both traits and symptoms than had Sandler and Hazari's (1960) group of 200 mixed neurotics, which Fontana suggested might be due to the presence of the buffer items disguising the purpose of the inventory; (2) his sample of 160 undergraduate and postgraduate education students also scored higher on both scales than Kline's (1967) student sample; (3) comparing each of his five 'normal' samples with the clinical group revealed significant differences in each case for women at the 0.01 level for symptoms and 0.05 level for traits, whilst for men the differences were less marked but in the right direction (perhaps affected by the smaller male samples); (4) the children's sample (121 11 year olds) scored more highly than adults, particularly on symptoms, and it is interesting to note that children also score higher on neuroticism (as measured by the J.E.P.I. (Eysenck 1965)) when compared with adults (using the E.P.I. (Eysenck and Eysenck 1964)). Fontana (1978) had also found a significant correlation ($p < 0.001$) between children's obsessiveness

scores and J.E.P.I. neuroticism which implies that perhaps the high symptom scores may be "part of a consistent pattern" (Fontana 1980, p.268). Correlations between traits and symptoms for each sample yielded only two significant correlations: +0.28 ($p < 0.01$) for male teachers ($n=132$) and +0.75 ($p < 0.05$) for the male clinical sample ($n=10$), but 11 out of 12 correlations were positive (range +0.03 to +0.30, with one at +0.75) which itself is claimed by Fontana to be unlikely to be due to chance ($p < 0.001$), although he admits the relationship is probably at a "complex and possibly tenuous" level (p.270).

Both Slade (1974) and Pollak (1979) conclude that, in general, obsessional symptoms seem to correlate positively with measures of emotional instability (neuroticism), with Pollak adding that traits can be reliably differentiated from symptoms and are probably normally distributed. Fontana's (1980) results from his adaptation of the Sandler-Hazari inventory seem to indicate that it can be used to discriminate clinical and non-clinical groups, and that it may be sufficiently wide in its coverage to usefully investigate personality in adults and children.

(c) The Leyton Obsessional Inventory.

This questionnaire was first described in detail by Cooper (1970) although it was designed specifically for a project on houseproud housewives and their interactions with their children some two years earlier (Cooper and McNeil, 1968).

The purpose of the inventory was to assess the attitudes of apparently normal housewives who were unusually houseproud or perfectionist in their approach to child-rearing and housework. In order to make the inventory applicable to wider groups Cooper (1970) gave alternative wordings for seven questions and dropped one altogether.

There was a total of 69 questions, divided into 46 covering symptoms and 23 traits (and not 47 and 22 respectively as given in Beech and Vaughan 1978). Although Rachman and Hodgson (1980) criticise this division as being arbitrary and "made on the basis of subjective judgement" (p.143), Cooper (1970) at least stated how he defined his basic concepts, even if one chooses to disagree. Symptoms related to the use of the word obsession as a psychiatric term, indicating "thoughts or ideas which come into a person's consciousness against his will" and which the person concerned cannot stop from intruding or accept as harmless. For obsessional personality traits Cooper followed the two types delineated by Lewis (1936), the uncertain, doubting and vacillating character on the one hand, with the stubborn, inflexible, morose and irritable on the other together with the type A individual described by Sandler and Hazari (1960): the meticulous, punctual, conscientious, tidy type who dislikes dirt. The type B character of these latter authors was similar to Lewis's (1936) doubting type and therefore already included.

Cooper (1970) now constructed questions for each of these two sections under the following sub-headings:

- A) Symptoms.
1. Unpleasant and recurring thoughts;
 2. Checking;
 3. Dirt and contamination.
 4. Dangerous objects;
 5. Personal cleanliness and tidiness.
 6. Household cleanliness and tidiness;
 7. Order and routine;
 8. Repetition;
 9. Over-conscientiousness and lack of satisfaction;
 10. Indecision.

- B) Traits.
11. Hoarding;
 12. Cleanliness;
 13. Meanness;
 14. Irritability and moroseness;
 15. Rigidity;
 16. Health (bowels);
 17. Regularity and method;
 18. Punctuality.

Where the criticism of Rachman and Hodgson (1980) does have some validity is in the allocation of dirt and overconscientiousness to the symptom section when Cooper had originally written of them in terms of traits. However, it is also clear that both could be construed in terms of psychiatric symptomatology as well. What Cooper does not explain is why he made this particular allocation as he did. One possible explanation would be the extremeness of the behaviour being investigated, but examination of the questions does not really help. The relevant questions for dirt and contamination are:

- 1) Do you hate dirt and dirty things?
- 2) Do you ever feel that if something has been used, touched or knocked by someone else it is in some way spoiled for you?
- 3) Do you dislike brushing against people or being touched in some way?
- 4) Do you feel that even a slight contact with bodily secretions (such as sweat, saliva, urine, etc.) is unpleasant or dangerous, or liable to contaminate your clothes or belongings?
- 5) Do you worry if you go through a day without having your bowels open?

One could argue that answering yes (and one only has the choice

of yes or no) to several of these questions would be the response of many normal people.

Clearly there is an overlap between the first three questions and the trait category of cleanliness, whilst question 5 could more appropriately be placed in the trait category of health. The fact that the trait of conscientiousness actually appears in the symptom section as over-conscientiousness explains its allocation.

Cooper and Kelleher (1973) admit that all 69 questions in fact refer to topics that are "common in obsessional conditions" but explain that the symptom questions were intended to be worded so that an affirmative reply implied "an element of nuisance, complaint or distress" whereas the trait questions carried no such implication. However, they further admit that a number of the traits covered by the inventory are "regarded as common in patients who develop obsessional disorders". This distinction between traits and symptoms is far from clearcut and may depend on the professional standpoint of the particular writer - here Cooper is a psychiatrist; a behavioural psychologist may well have other views, for example.

In the Leyton Inventory two further scores, apart from symptoms and traits, are in fact obtained. 35 symptom and 4 trait questions are followed through two further stages if they are answered affirmatively. These stages measure resistance, that is the presence and severity of any feelings of resistance to carrying out the behaviour concerned, and interference, that is how much time is wasted on the particular activity and how much it interferes with other activities. The 5 Resistance categories, to one of which the subject has to allocate the appropriate questions, are as follows:

- 1) Sensible (this is quite a sensible and reasonable thing for me to do);
- 2) Habit (I do it automatically without really thinking about it);

- 3) Not necessary. (I don't bother to stop);
- 4) Try to stop. (I know this is not necessary and try to stop it);
- 5) Try very hard to stop. (This upsets me a great deal and I try very hard to stop it).

The following scores are given: 1) =0; 2)&3) =1; 4) =2; 5) =3.

The 4 interference categories are:

- 1) No interference (this does not interfere with other activities);
- 2) Interferes a little (this does interfere with other activities a little or wastes a little of my time);
- 3) Interferes moderately (this does interfere with other activities or wastes some of my time);
- 4) Interferes a great deal (this stops me doing a lot of things and wastes a lot of my time).

The following scores are given: 1) =0; 2) =1; 3) = 2; 4) =3.

Thus four scores are obtained from this inventory: symptoms, traits, resistance and interference. Unfortunately these four are not independent of one another, as was demonstrated with Cooper's (1970) own samples. Five specific samples were chosen:

- 1) 25 houseproud housewives;
- 2) 17 chronic "obsessional illness" patients, 10 inpatient and 7 outpatient;
- 3) 60 normal women, of whom 21 had been selected as controls for group 1);
- 4) 41 normal men, of whom 10 were husbands of the female controls;
- 5) 19 husbands of the houseproud housewives.

These samples merit some comment. Firstly, no details of age, education or socio-economic background are given for any group and these factors may well be relevant to the behaviours being investigated. Secondly, the obsessionally ill group comprises in-and

out-patients yet whether the patient was hospitalised or not would reflect the extent of his illness and presumably be reflected in both symptom and interference scores, although we are not informed and they are treated as a homogeneous group. Thirdly, by Cooper's own admission, many of the subjects in the third and fourth samples above were relatives and colleagues, that is "opportunistic" subjects, hardly selected at random. Fourthly, by separating the husbands of houseproud housewives from the "normal" men, he was implying they were different in some way yet he raises no hypotheses and of course has not controlled a number of other factors anyway.

The non-independence of the four scales was indicated by the fact that symptom and trait scores correlated significantly at the 1% level for samples 1), 3) and 4) above ($r=+0.87$, $+0.74$ and $+0.79$ respectively), and this degree of association held up separately for sample 3) when it was divided into 2 sub-samples, those with a symptom score at or below the mean, and those with a score above the mean, ($r=+0.43$ and $+0.65$ respectively).

The interpretation of the resistance and interference score is made difficult since the influence of the rank of the ratings is clearly confounded with the number of items making up the total score (a subject with high ratings on a few items will obtain a similar score to one obtaining low ratings on many items), as Beech and Vaughan (1978) point out.

What is perhaps surprising is that three of the samples can clearly be differentiated on all four scales. The chronic obsessional patients score more highly than the houseproud housewives, who score more highly than the normal women (both $p<0.01$). Furthermore, the normal women score more highly than the normal men on symptoms ($p<0.05$) and resistance ($p<0.01$) (despite Cooper's

contention elsewhere in the same paper that there were no sex difference for symptoms or traits), and the husbands of houseproud housewives obtained higher scores on symptoms than the normal men ($p < 0.05$).

The first of these results (patients versus houseproud versus normal women) were in the predicted direction, the second (women versus men) may be confounded by the fact that the inventory was designed for women and the male version simply had a few cosmetic changes (such as substituting "work" for "housework"), and the third may reflect a greater sensitivity to certain behaviours and attitudes on the part of men who have lived for some time with houseproud housewives and who may of course have contributed to, even provoked in some way, or suffered from the houseproud behaviour of their spouses. As Cooper did not strictly follow the scientific method and erect specific hypotheses, with particular reasons for them, it is difficult to discern his line of reasoning.

Cooper concludes that the symptom and trait scores are "in need of some attention" (unspecified) before they can be regarded as adequate differentiators between obsessional symptoms and traits but he still regards his test as valid since it differentiated between obsessional patients and normals with little overlap, and where the symptom score does not differentiate then resistance plus interference does. Cooper admits that the results "represent a subjective assessment of attitudes" and the relationship with overt behaviour is not known; thus it seems he could be dealing only with obsessional complaints, rather than observable obsessional activity, and the only validity the inventory has is face-validity.

Test-retest reliability was not investigated directly but, by a curious sampling procedure, Cooper (1970) combined ten of his

subjects (no details given), who happened to have completed the questionnaire twice, with twenty randomly selected subjects from the sample of 60 depressive patients, tested before and after treatment by Kendell and Discipio (1970) - hardly a homogeneous group altogether - and obtained a correlation of +0.91 for the trait scale and +0.87 for the symptom scale. These correlations in fact seem rather high when one considers that the differences between the patients' scores before and after treatment, for the whole of Kendell and Discipio's sample, on symptoms and traits were statistically significant at the 2% and 5% levels respectively.

Comparisons between Kendell and Discipio's depressive sample and Cooper's various samples appear worthy of mention here. The depressives' average age (the authors do not state whether this is a mean or median) was 39 years, with a very wide range of 16 to 68. There were 28 males and 64 females, all having been hospitalised for depressive illness. These figures refer to the original sample of 92, but 32 subjects were eliminated for various reasons (18 could not be retested because they remained depressed, 2 could not understand the questions and 12 were tested only after recovery); the sex and age distribution of the remaining sample, whose test-results are the ones analysed and reported, are not given. The average interval between testings was 87 days but again the range was extremely wide (12 to 310 days).

The depressive sample's scores were similar to Cooper's houseproud housewives, and the differences between the depressives and Cooper's obsessively ill group on symptoms, resistance and interference were all significant ($p < .001$), the difference on traits being in the predicted direction but not reaching a significant level (all scores lower in the depressives). In fact it is the resistance and interference scores which show the greatest differentiation leading the authors to state that the

two groups are distinguishable by the severity rather than the extent of obsessional symptoms.

When the patients' scores after recovery were examined, symptom and trait scores correlated significantly at the 1% level ($r = +0.78$). This led Kendell and Discipio to comment that the distinction between traits and symptoms was "somewhat arbitrary". They felt that many traits were potential symptoms, since if they became too prominent they would cause distress, and also that if certain patterns of behaviour were life-long they were called traits whereas if they only occurred "during phases of illness" they were called symptoms. This almost seems to be a curious variant of the "halo effect" - if a physician diagnoses a person as ill then all of his behaviour patterns are interpreted as symptoms of that illness.

Kendell and Discipio did try to distinguish between patients with obsessional traits and those without, and found that those with such traits had significantly higher scores on symptoms ($p < .01$) and resistance ($p < .05$) than those without, interpreting this as further evidence of the relationship between traits and symptoms. However, their original criterion for separating the two subgroups was highly questionable. The authors made the split on the basis of the trait scores obtained after recovery (those scoring 10 or more being regarded as "with obsessional traits", those 9 or less "without") and assumed that these scores represented the patients' normal or premorbid personality. It could be argued that the experience of severe depression, hospitalisation and the process of treatment, could separately and collectively have lasting effects on the individual (and some patients were tested only two weeks after their official recovery when they were in some cases still in hospital) and therefore make their scores different from how they would have been prior to their treatment.

Pre- and post-treatment analyses were employed by Allen and Rack (1975), whose 15 patients were obsessive-compulsives undergoing treatment with clomipramine (Anafranil). Their sample did not differ on any of the four scales from Cooper's sample of obsessional patients (however, the two samples were rather small - 15 and 17 subjects). The 15 patients differed between pre- and post-treatment on symptoms and interference only ($p < .01$) which led Allen and Rack to conclude that the interference scale was probably the best indicator of the severity of the problem. Although the changes in symptom and interference scores coincided with clinical improvement the authors felt it was unclear whether the Leyton score changes actually measured improvement.

Emmelkamp and Kwee (1977) on the other hand found that the only scale which showed a statistically significant change before and after treatment for obsessional ruminations was that for traits, although the other three scales showed non-significant decreases in scores. However, there were several differences between the two researches. Emmelkamp and Kwee only had 5 subjects (1 male), aged between 23 and 51, who had obsessional ruminations but no ascertainable compulsive rituals, the treatment comprised thought stopping and prolonged exposure in imagination and the statistical design was a cross-over with a one-tailed test of significance for dependent samples.

When treatment consisted of gradual exposure in vivo, Emmelkamp et al. (1980) found significant ($p < 0.001$) decreases on all four scales over time (pre-test, 5 weeks' treatment, post-test, 1 month follow-up and six months' follow-up) with a sample of 15 obsessive-compulsive patients (5 male, age range 22 - 68 years). The greatest decrease in fact occurred at the post-treatment test, with much smaller decreases thereafter.

It is difficult to compare the two Emmelkamp studies since they differed on so many factors. The samples differed in size, age-range, sex ratio and nature of complaint (ruminators versus unspecified 'obsessive-compulsives'), the treatments were different and the statistical analyses varied. Moreover, the pre-test scores greatly differed between the samples, the scores of the earlier sample being closer to the post-treatment scores of the later group - thus Emmelkamp and Kwee's (1977) sample had pre-test scores which had less room for diminishing, and it could be argued that Emmelkamp et al's (1980) sample had far greater problems to start with, if one assumes the L.O.I. scores to be a valid indicator.

Rabavilas et al. (1979) set out to compare the effects of flooding on two groups of obsessive-compulsive patients differing in pre-morbid personality (as measured by the Trait subscale). The obsessional group (that is, with higher trait scores) differed initially from the non-obsessional group (lower trait scores) mainly in a slightly higher symptom score and much higher interference score (perhaps adding weight to Allen and Rack's (1975) suggestion that interference indicates severity), but after treatment the symptom, resistance and interference scores fell significantly ($p < .001$) to a similar level. The trait scores did not alter significantly. These results again differ from the two Emmelkamp studies, but differences on the factors mentioned in the previous paragraph contribute once more. Rabavilas' two groups were each only six strong, the pre-morbid obsessional group comprising 2 women, 4 men, mean age 29.5 years, the non-obsessional group comprising 1 woman, 5 men, mean age 31 years. The statistical analysis was by a t-test, and the whole sample was selected by a semi-structured interview carried out by two psychiatrists briefed to look for "characteristics of orderliness,

obstinacy, parsimony, uncertainty". (No details of the degree of agreement between the two were given).

Rather more drastic treatment was used by Mitchell-Heggs, Kelly and Richardson (1976) with their sample of "obsessionally ill" patients. The treatment involved a stereotactic limbic leucotomy on their 12 patients, whose mean age at surgery was 37 years (range 23 - 53) and who had on average been ill for 13 years. Scores on all four subscales diminished significantly between pre-operation and 16 months after surgery (probability levels being 0.05 for traits, 0.001 for the rest). Interestingly, scores were reduced similarly in a group of "mixed diagnosis" patients (n = 25) whose initial trait scores were similar to those of the obsessional group although their other three scores were much less (particularly so on resistance and interference). Moreover, there was a significant decrease in Neuroticism as measured by the Maudsley Personality Inventory.

The relationship between Eysenck's factors and the L.O.I. was examined by Kendell and Discipio (op.cit.), although one must remember that their sample comprised patients with depressive illness, the severity of which necessitated hospitalisation, although the following data are based on their scores after recovery. The L.O.I. Trait score correlated +0.48 ($p < .01$) with Neuroticism (E.P.I.), and -0.14 (not significant) with Extraversion, whereas the Symptom score correlated +0.53 ($p < .01$) with Neuroticism, and -0.30 ($p < .01$) with Extraversion. (In fact, Symptom and Trait scores correlated +0.78 ($p < .01$).) Kendell and Discipio's observation is that "the clinical impression that depressives with obsessional symptoms tend to be both neurotic and introverted is thus confirmed". The authors further infer that the Symptom score "has much in common with general measures of neuroticism"; one could add that on their figures the same inference applies to the Trait score as well.

Rabavilas et al. (op.cit.) administered the E.P.I. at the end of treatment to their two small samples and found that the obsessional group (higher scores on Traits) did in fact have lower scores on extraversion (but not to a significant degree) although they did not differ on neuroticism.

Thus the relationship between traits and extraversion is similar in these two studies, but the association between traits and neuroticism is dissimilar, despite Kendell and Discipio's inference of generalisability. Again, one can point to differences in the samples studied as factors in this dissimilarity since Rabavilas's patients were primarily obsessive-compulsives, and Kendell and Discipio's were primarily depressives.

Both the Leyton and Eysenck inventories were used by Smart, Beumont and George (1976) in their study of 22 post-pubertal female patients suffering from anorexia nervosa. Their sample had a mean age of 18 years (range 13 - 26) and mean duration of illness of 28 months (range 6 - 120). Compared with Cooper's (1970) sample of normal women (n = 60), Smart et al's subjects had significantly higher scores on all four Leyton scales ($p < .001$). Compared with Cooper's chronic obsessional group (n = 17) Smart et al's women had significantly lower scores on Symptoms and Resistance ($p < .001$), and on Interference ($p < .02$), whilst the Trait scores did not differ to a significant degree. The fact that these anorexics fell between the normal and chronically obsessional groups ties in with the findings of Warren (1968), one third of whose sample showed definite signs of obsessionality; Halmi (1974), the majority of whose subjects had obsessive-compulsive traits; Lesser et al (1960) who divided their anorexics into 3 groups: histrionic, withdrawn and rigid/perfectionistic; and Dally (1969) who felt that most of his patients were markedly inhibited, dependent and obsessional during childhood.

Smart's anorexics were significantly more neurotic ($p < .001$) than Eysenck's standardisation sample and also less extraverted ($p < .02$). Their scores on both Extraversion and Neuroticism did not differ from Eysenck's group of "mixed neurotics". Unfortunately, Smart did not carry out any correlations on his data, so all we may conclude is that his anorexics were more neurotic, more introverted and more obsessional than 'normal' samples.

(d) The Crown-Crisp Experiential Index.

This Index was first published as the Middlesex Hospital Questionnaire (Crown and Crisp 1970) having appeared in a preliminary, shorter form in Crown and Crisp (1966). It acquired its new title on republication (Crown and Crisp 1979) although the content was unchanged. It was designed to obtain "an approximation to the diagnostic information that would be gained from a formal clinical psychiatric examination" (Crown and Crisp 1979, p.3). The authors claim that it is useful for obtaining personality profiles, for objectifying and comparing groups in general medicine and education, and for measuring change before and after therapeutic intervention, for example. Thus they see it as applying both to clinical and non-clinical populations.

The Index comprises six sub-scales, measuring free-floating anxiety, phobic anxiety, somatic concomitants of anxiety, depression, hysteria and obsessionality. In addition to separate scores on these sub-scales, the summated score is claimed to provide a measure of general emotionality or "neuroticism".

As with the other sub-scales, obsessionality has eight questions in the Index. Although the authors define obsessionality as "an excessive meticulousness, adherence to routine, punctuality, dislike of sudden change, need to control the environment, tendency to over-check, (and) dislike of dirt", the actual questions in fact cover conscientiousness, cleanliness, love of work, perfectionism, recurrence of unreasonable thoughts, unnecessary checking, worrying over trivial matters and disturbance of routine. The first four of these items were shown to cluster together in a principal components analysis by McGuinness (undated), and were labelled traits, whereas

the latter four items clustered together orthogonally and were labelled symptoms. Crown and Crisp (1979) define traits as attributes of personality "whose distribution is normal (Gaussian) in the general population", whereas symptoms are matters complained of by a patient.

On the basis of this distinction one might expect a clinical sample therefore to show higher scores on this subscale than a non-clinical sample, since symptoms by definition are only shown by patients. In fact two separate studies confirmed this. Firstly, Crown and Crisp (1966) found a statistically significant difference between a sample of psychiatric outpatients (n=62), whose mean score was 8.5, and a group of nurses and medical students (n=109), whose mean score was only 5.8 ($p < 0.01$). Secondly, Crown, Duncan and Howell (1970) obtained a mean score of 6.7 for their sample of 596 male atomic energy workers, which was significantly different from both the above sample's means. It must be pointed out that Crown and Crisp's (1966) samples comprised male and female subjects, and there have been reported sex differences, age relationships and class differences.

In a normal sample of 719 (343 male, 376 female) selected by taking every fifth subject from the list of a group general medical practice (which of course would contain some "clinical" patients), Crisp et al (1978) found a significant difference between the sexes, females scoring higher, between age-groups for men but not women (scores increasing with age), and between social classes 1/2 and 3/4 for females but not males (scores higher with lower class grouping), although the male interaction of class and obsessionality score follows a U-shaped curve, classes 3/4 being higher at age 40-49 than

classes 1/2, but the gap narrowing over other decades and reversing at 20-29 and 60-69. Crown, Duncan and Howell (1970) found that with their male sample, classes 3/4 scored significantly more highly ($p < 0.05$) than groups 1/2/3 ($n = 276$ and 320 respectively). There was also an age difference, men over age 47 scoring more highly ($p < 0.01$) than those under 47, and a sex difference with another sample, men scoring more highly than women ($p < 0.01$), although there was a large disparity between the size of the samples involved, the women numbering only 36, whilst the men totalled 1,208.

With a clinical sample of 780 new referrals to a psychiatric outpatient clinic, Crisp, Jones and Slater (1978) found no significant difference between the sexes ($n = 286$ men, 494 women), the mean scores being almost identical to those obtained by Crown and Crisp's (1966) outpatient sample. However, when those referrals later diagnosed as suffering from obsessional neurosis were examined, it emerged that the women scored at a higher level, although the samples were relatively small (15 males, 31 females).

Women also scored at a higher level ($p < .007$) in a general population sample examined by Crisp and Priest (1971), who administered the C.C.E.I. to 778 patients, aged 40 - 65, on the list of a general practitioner in London. This sample would have included patients already under psychiatric treatment, receiving treatment for psychoneurotic illness by the general practitioner himself, those with "morbidity" but not actually being treated, as well as those without any "psychoneurotic morbidity". Thus, the only group definitely excluded from this sample would have been psychiatric in-patients, yet Crisp and Priest (op.cit.) and Crown and Crisp (1979) both describe this sample as "a general population",

implying it is a non-clinical sample. Strictly speaking the sample is a mixture of normal and clinical groups, excluding only the most severe or extreme clinical cases, and is therefore in no sense a "pure" non-clinical group.

Attempts have been made by some researchers to examine purely non-clinical groups and compare them with clinical cases, and convenient populations have included university students although clearly variables such as intelligence, educational background and age are severely restricted. Crown, Lucas and Supramaniam (1973) administered the C.C.E.I to 223 normal controls (the 1970 intakes to the English, Chemistry and Medical Departments) and 81 'clinical' cases, students who were patients of the college health service for other than purely physical problems. However, the obsessionality scale failed to differentiate between the two groups, but with a modified version of the scale included in the University College London Study Questionnaire (U.C.L.S.Q.), obsessionality did discriminate, patients scoring at a higher level ($p < 0.02$). A similar result occurred in Lucas et al. (1976); the U.C.L.S.Q. obsessionality scale discriminated between a sample of 72 undergraduates referred to the health service for emotional reasons (and called patients) and 73 referred for non-psychiatric reasons (labelled controls), the former obtaining the higher scores ($p < 0.01$).

However, one must take issue with the authors for the way in which the samples are labelled since, by contrasting 'emotional = patients' with 'non-psychiatric = controls', they imply that emotional problems are psychiatric problems. Although some emotional difficulties may become extreme enough to warrant psychiatric

intervention, most do not - indeed it could be argued that many normal people have occasional emotional problems, but that hardly warrants the implicit label of psychiatric. Furthermore, it makes comparisons difficult with other clinical groups, since the criteria for being labelled "clinical" or "patient" or "psychiatric" may vary enormously. With the same sample as Lucas (op.cit.), Stringer et al (1977) found the C.C.E.I. obsessiveness scale also discriminated between the two groups ($p < 0.01$). Also administered at the same time was the Dynamic Personality Inventory (D.P.I.) (Grygier and Grygier, 1976), which has five anal scales related to the psychoanalytic concept of the obsessional character. The obsessiveness scale of the C.C.E.I. correlated significantly with D.P.I.'s Ad (obsessiveness) and Aa (submissiveness) scales for both control and patient groups, with the Ac scale (conservatism) and As (authoritarianism) with the patient group only, and with the Ai scale (insularity) for the control group only. In fact only the As scale discriminated between the patient and control groups. When the U.C.L.S.Q. obsessiveness scale was compared with the D.P.I. there were fewer significant correlations; with Ad and Ac for patients only, and with Aa and Ai for controls only. (Although this sample is the same as the previous one, it is interesting to note that in this latter paper, the patients are described as "students seeking psychological help" which is not the same as saying they have been "referred for emotional reasons" and again does not warrant a contrast with "non-psychiatric".) It is interesting to note that there were no significant correlations between obsessiveness (whether measured by C.C.E.I. or U.C.L.S.Q) and academic performance, nor did any of the D.P.I. anal factors correlate with academic performance.

When the same authors' (Crown et al. 1977) added a questionnaire measuring self-esteem (after Rosenberg 1965) and another measuring conscience (constructed by Crown et al 1977), to the U.C.L.S.Q., C.C.E.I. and D.P.I. with the same sample, they found that obsessionality (C.C.E.I) correlated significantly with conscience ($r=+0.44$ for controls ($p<0.001$), $r=+0.25$ for patients ($p<0.05$) and for the total sample ($p<0.01$). The authors point out that an excess of conscience in the form of guilt is shown in obsessional neurotics, but if this were the case one might expect the patient samples's correlation of obsessionality and conscience to be higher than that of the control group, when in fact the reverse was found. Even the cautions expressed about the labelling of the patients sample would not account for this. One possible explanation not offered by Crown and his colleagues is that the relationship between obsessionality and conscience is curvilinear in some samples, and not rectilinear as they imply. This might then account for the lower correlation in the patient sample, since product-moment correlations only show straight-line relationships.

Another study with students was carried out by Ryle and Breen (1972) who found that their patient group (33 students consulting the university health service for "neurotic problems" and felt to be "in need of at least four long appointments") scored significantly more highly on obsessionality (C.C.E.I) ($p<0.05$) than their control group (54 students). Here at least the authors were more specific in their criteria for selecting their patient group.

A confusion of a different sort occurs in Kalucy, Crisp and Harding (1977) who examined 44 families with a child suffering from anorexia nervosa (compulsive weight reducing). In the text they refer to "obsessive compulsive reactions" and in a table relating to

this they refer to "marked' obsessional traits", clearly using the terms synonymously, and also using them interchangeably with "obsessive compulsion syndrome" and "obsessionality". They do define "obsessive compulsion" as referring "more to a dominant life-style and traits than to formal diagnosed illness or history of treatment" (p.392) (my underlining); the confusion is caused by their departure from convention since it is accepted that traits refer to normal characteristics in the general population, and obsessive compulsive syndrome is a recognized psychiatric (and therefore clinical) classification, which Crisp, one of the co-authors here, recognized in another paper (Crown and Crisp, 1979).

Factorial studies which have been carried out on the C.C.E.I. include that of Lucas et al. (1976), using the same sample as Crown et al (1977) and Stringer et al. (1977), and employing the C.C.E.I., the D.P.I. and U.C.L.S.Q. A varimax rotation of the intercorrelations yielded a major factor, loading on anxiety, somatic concomitants of anxiety and obsessionality, for patients, and a major factor, loading on depression, anxiety, obsessionality and somatic concomitants, for controls. Bagley (1980) checked the internal reliability of the C.C.E.I. by a principal components analysis of data on 256 students (in subjects as diverse as nursing, education, and social work) with an age range of 18 - 46 (median 26). He found strong internal unity of all the Scales, although it was evident that there was some item overlapping. An unrotated factor analysis yielded a general factor accounting for 14% of the variance, the next factor accounting for only 5%. A varimax rotation yielded seven factors, six roughly similar to the C.C.E.I.'s six subscales and one general factor. When hysteria was excluded, the five remaining scales combined correlated +0.73 ($p < 0.001$) with Eysenck's Neuroticism, suggesting a general psychoneurotic

factor. This accords with Williamson (1976) who, with a sample of 545 normal male subjects, found a general emotionality factor accounting for the largest amount of variance. It is interesting to note that Bagley's fifth factor, obsessionality, only had reasonably large weightings from 5 of the 8 items on the Index. The remaining three items contributed to factor 1 (anxiety and depression), with obsessionality item no.45 loading at +0.54 and item 15 at +0.40 to factor 3 (general emotionality), item 33 loading at +0.47, and to factor six, with item 15 (again) loading at +0.35. A further point, not made by Bagley, is that the obsessionality factor has all four symptom items loading on it and only one trait item (no.33). The items contributing to the other factors are all trait items. Thus his obsessionality factor must be construed in a mainly clinical sense and not in terms of the obsessional character found in non-clinical populations, although of course his sample comprised ostensibly normal subjects.

Cross-cultural evidence on the validity of the Index has been supplied by Dasberg and Shalif (1978) who translated the C.C.E.I. into everyday Hebrew and administered it to 216 adults (95 male, 121 female), broken down into nine subgroups of 24, with such labels as psychiatric outpatients, recurrent patients at a general practice, acute patients, normal controls (students, psychiatric staff) and undifferentiated. The findings indicated that obsessionality (along with phobic anxiety) discriminated least well between the subgroups (however, there was no specifically obsessional group) and obsessionality (along with phobic anxiety and hysterical reactions) was more specific in the sense of less overlap with other subscales. There was no significant correlation between any of the scales and

sex or age, although there was a slight positive relationship between obsessionality (and somatic anxiety, depression and total score) and age.

In order to establish the presence or absence of an hereditary factor operating with the C.C.E.I., Young, Fenton and Lader (1971) examined 64 males aged 19 - 40, among whom there were 17 pairs of monozygotic twins (mean age 28) and 15 pairs of dizygotic twins (mean age 27). Zygoty was established by blood grouping, where the chance of misclassifying a fraternal pair as identical is 1 in 20 (Smith and Penrose, 1955). For obsessionality the intraclass correlations (mean within-twin-pair differences) were not statistically significant. Obsessionality only correlated with depression (+0.46, $p < 0.005$), which may be allied to the fact that obsessionality and depression tend to move together with increasing age (Crown, Duncan and Howell, 1970). Young, Fenton and Lader conclude that for "obsessional symptoms" no hereditary factors seem to operate. Here they are clearly referring to the whole obsessionality subscale, which, as has been noted previously, comprises both symptoms and traits; the authors did not separately comment on traits alone. A secondary finding was that correlations between obsessionality and Eysench's neuroticism (+0.25) and extraversion (+0.14) failed to reach statistical significance.

In conclusion, the obsessionality subscale of the C.C.E.I. has proved a useful test in discriminating between different samples of the population. There are relationships with sex, age and social class within normal populations, clinical samples (not necessarily obsessionals) tend to score more highly, and in cases of obsessional neurosis there are sex differences again. Although there is a

separation on the scale between obsessional traits and symptoms, a total of four items on each cannot help the scale's discrimination from other subscales or between these two aspects of obsessionality.

(e) The Blacky Pictures

Only one projective personality technique appears to attempt an indirect measure of obsessionality and that is the Blacky Pictures (Blum 1949, 1950, 1951).

This technique involves presenting twelve cartoons of Blacky the dog in various situations with "Mama, Papa and Tippy" to the subject who is required to tell a spontaneous story about the picture, answer a series of inquiry questions (open-ended for children but multiple-choice for adults) and then sort the pictures into the categories of 'liked' and 'disliked', finally selecting the most and least liked pictures. The cartoons are designed to measure the dimensions of oral eroticism, oral sadism, anal sadism, oedipal intensity, masturbation guilt, castration anxiety (males) or penis envy (females), positive identification, sibling rivalry, guilt feelings, positive ego ideal and love object. Anal sadism is split into anal expulsiveness and anal retentiveness based on the results of the story, questions, sorts into categories and "related comments" (for example reference to a particular theme made in the course of responses to another cartoon).

One of the major problems with this type of technique is in the interpretation of the responses. Indeed, it is interesting to note that various authors, in merely describing the pictures, unwittingly make their own interpretations. For example, with picture number 7 (positive identification) the following descriptions are made:

1. "Here is Blacky with a toy dog" (Blum 1950).
2. "Blacky is playing with a toy dog" (Kline 1972).
3. "Blacky is waving his paw over a small wooden dog on wheels" (Semeonoff 1976).

4. "Blacky appears to be instructing, ordering or dominating a miniature dog on wheels" (Sappenfield 1965).
5. "Blacky is making an assertive gesture towards a toy dog" (Hilgard 1952).

In addition to problems of interpretation, there is the possibility of contamination between pictures since questions are asked after each story (Semeonoff 1976) and some questions presuppose a particular interpretation anyway - for example, in number 10: "What would be the main reason for Blacky wanting to be like the figure in his dream?".

The choice of a dog may affect the stories given by subjects since it is usually seen as male (Rossi and Solomon 1961, Robinson and Hendrix 1966) despite Blum's (1950) contention that Blacky is seen as the same sex as the subject by both males and females. Neuman and Salvatore (1958) even suggest that it might be better to have a cat for female subjects since they perceived both "Blacky" and "dog" as significantly more masculine than the term "cat". The name Blacky could possibly be racially prejudicial and the question has been raised (but apparently not answered) about whether dark-skinned children identify more easily (Sappenfield 1965). The terms "Mama" and "Papa" may also serve to encourage children particularly to regress and fixate a regressive attitude, thus preventing the responses from "maturing" during the sequence of pictures which follow psychoanalytic development theory (Sappenfield op.cit).

Blum (1949, 1950) argued that the inter-correlations between the psychosexual dimensions strongly supported psychoanalytic theory and hence the validity of his test, but Seward (1950) and Zubin, Eron and Schumer (1965) attacked this on the grounds that Blum had only

studied the significant correlations and only looked for theories to test after he had obtained his results. This could involve fitting the data to the theory or the theory to the data. Indeed, Newton (1959) stated that Blum structured his pictures and questions in such a way as to make the responses fit the theory.

A factor analysis carried out by Neuman and Salvatore (1958) generally supported the validity of the pictures, insofar as the factors seemed to be in accord with psychoanalytic theory, although this was only true for their male sample. Blum himself (1962) factored the responses of 210 male subjects and found thirty factors, many of which were in accord with psychoanalytic theory. However, great weight appeared to have been given to the multiple-choice questions. Further, Kline (1972) confirmed that it was best to ignore the anal expulsive-retentive dichotomy and regard both as measures of anal eroticism.

Finally, Anastasi (1961) admitted that the technique was an ingenious research tool but added that it could have little practical value until much more empirical information had been obtained as to what exactly it measured, although Sappenfield (op.cit.) felt that there was more evidence for its validity than for its lack of validity, despite the reliability scores not being high enough to commend it for use in diagnosing individual personalities. Kline (1972) at least claimed that the technique gave some evidence confirming psychoanalytic teaching in relation to pregenital phases of psychosexual development.

(f) Kline's Measure of the Obsessional Character: Ai3Q.

Kline produced his measure of the obsessional or anal character, the Ai3Q, in 1971, following his opinion that none of the most widely used personality tests contained a measure of the obsessional personality. If this dimension was important, he argued, then "the scientific study of personality demanded an adequate measure of it".

Kline decided to examine such tests as the 16 PF (Cattell), E.P.I., M.M.P.I., and scales by Barnes (1952), Krout and Tabin (1954), Beloff (1957), Hazari (1957), Grygier (1961) and Gottheil (1965). After casting out those considered invalid by reason of lack of control of social desirability and acquiescence, Kline considered that none of the remainder contained a measure of the obsessional or anal character. Of the major questionnaires neither the E.P.I. nor 16 PF contains measures of obsessional traits or symptoms, while the M.M.P.I. has an obsessional neurosis scale but it measures symptoms not traits.

In constructing his own measure, Kline began with an item pool of 70 items based on a search of the literature, and checked for acquiescence by keying half of the responses "No". Initially a sample of 203 students and teachers was used, and a subsequent item-analysis resulted in some re-writing and abandoning of items. A second version was then administered to 300 students. A further item-analysis was carried out, and only those which correlated beyond +0.3 with the total score on both trials were included in the final inventory. This version comprised 30 items, covering such traits as orderliness, parsimony, cleanliness, obstinacy, the desire to dominate, feelings of personal perfection, vindictiveness, the

dislike of feeling obliged to others, procrastination and hoarding followed by throwing out.

These 30 items were subjected to an item-analysis on a sample of 98 students, the result being that the majority of items had correlations with the total score of beyond +0.4, and only one falling below +0.3, which was left in since Kline argued that "a certain amount of fluctuation in item statistics is not uncommon".

Six studies with students from Britain and Ghana indicated an internal consistency of just below +0.7, and although Kline accepted that this was not as high as desirable, he claimed it was higher than many other comparable personality inventories and hence "certainly sufficient for research purposes". Analysis of the test's discriminatory power yielded Ferguson's Deltas of 0.970 and 0.965 with two samples of some ninety students each. Kline concluded that his test combined satisfactory reliability with very high discriminatory power, adding that high reliability was antithetical to high discrimination and it was the latter which was important in psychometrics (see also Guilford 1956).

When it came to validity, Kline saw the difficulty of establishing a criterion and resolved it by concentrating on construct validity, pursuing the idea that if the Ai3Q were measuring the obsessional personality than no substantial correlations with the Cattell or Eysenck tests would be expected. If it were measuring some other factor then the correlations with the Cattell scales should clarify its nature.

His first validity study, on 110 Ghanaian students, supported the construct validity of his test, yielding only one statistically significant correlation, with Cattell's F - (desurgency).

Factor analysis indicated that the Ai3Q loaded on the same factor as G+ (superego strength) C+ (ego-strength) Q3+ (self-control) and Eysenck's Lie Scale, all in line with his predictions.

A second validity study was carried out with 97 students, 11 of which were experienced teachers. The following scales were used: Beloff (1957) (traits), Hazari (1957) and Sandler and Hazari (1960) (traits and symptoms) and the M.M.P.I. (12 symptom scales). The Ai3Q had "substantial correlations" with the other measures of obsessional traits: +0.530 with the Hazari items (traits) and +0.423 with the Beloff scale, both correlations being statistically significant. The correlations with the symptoms scales were all "low (and) non-significant", being +0.110 in the case of the Hazari items (symptoms), and ranging from - 0.228 to +0.198 on the M.M.P.I. scales. The only other significant correlation with the Ai3Q was attained by the Lie Scale of the E.P.I., which was +0.301, dismissed by Kline as being "not high enough to invalidate the scale." He omits to mention that in fact the correlation is in line with an anticipated relationship between the two, insofar as the lie scale can indicate subjects who are simply "better behaved" (Eysenck 1965).

A Varimax factor analysis of the intercorrelations indicated a factor which Kline labelled "obsessional personality" and on which all the obsessional trait scales loaded (Ai3Q, : +0.707; Beloff : +0.863; Hazari (traits) : +0.768) and none of the M.M.P.I. scales or the Hazari symptom items (range from -0.234 to +0.358). Kline therefore claimed that this analysis "strongly supports the validity of the Ai3Q as a measure of the anal character".

His third validity study made use of Grygier's (1961) Dynamic Personality Inventroy (D.P.I.) and his sample comprised 20 students

from two teacher-training colleges. Grygier had developed his virtually new test from the Krout Personal Preference Scale (Krout and Tabin 1954). The D.P.I. comprised 32 scales designed to assess "tendencies, sublimations, reaction-formations and defence mechanisms associated with the various patterns of psychosexual development", although Kline's (1968b) Varimax factor analysis revealed only 11 factors, of which only one could be reasonably identified with one of the previously hypothesised developmental factors : the anal factor. This had positive loadings on the following: hypocrisy, submission to authority, conservation, attention to detail, hoarding, anal sadism, tendency to plan and masculine identification. There were negative loadings on unconventionality and sexuality. Kline formed the opinion that the D.P.I. was not validly testing Freudian developmental theory (although Grygier had been careful to state that psychoanalysis had only been the stimulus for his scales, not the framework for them) but he concluded that the anal scale was valid. Since there was some resemblance between the anal character and the obsessional personality, argued Kline (1971), there should be a measure of agreement between the Ai3Q and the anal scales of the D.P.I.

In fact the results indicated significant correlations between the Ai3Q and the following scales of the D.P.I.:

- (1) submission to authority (+0.556) (anal scale)
- (2) conservation/rigidity (+0.514) (anal scale)
- (3) orderliness/attention to detail (+0.606) (anal scale)
- (4) hoarding behaviour (+0.403) (anal scale)
- (5) insularity/reserve and mistrust (+0.356) (anal scale but not psychoanalytic)

- (6) anal sadism/strong authority (+0.322) (anal scale)
 - (7) hypocrisy (+0.560)
 - (8) impulsiveness (-0.424)
 - (9) unconventionality (-0.404)
 - (10) sexuality (-0.417)
- (all the above significant at the 0.01 level)
- (11) ego-defensive persistence (+0.248) (significant at the 0.05 level)

These data indicated for Kline that the Ai3Q and the anal scales of the D.P.I. were measuring a common factor, but that the Ai3Q was more "factor pure" since some of the D.P.I. anal scales had substantial (+0.3) loadings on factors other than the anal one, which could affect their validity.

However, it must be pointed out that Kline's interpretations of the results should perhaps be treated with at least a modicum of caution in view of the sample size (20), and later Cattell and Kline (1977) suggested that the Varimax orthogonal factor analysis may have been a "technical shortcoming". Another analysis of the D.P.I. was made with a much larger sample by Stringer (1970) but again the factors were difficult to identify.

As a final study (1971) Kline use a 5 point behaviour rating scale, completed by tutors, on 65 students. The behavioural description to be noted was "careful, methodical, neat, pedantic, determined in his opinions, cautious" and the points on the scale were:

- 5. Has all these traits to a high degree.
- 4. Has many of these traits to a high degree or all to a more moderate extent.
- 3. Has some of these traits to a moderate extent.

2. Has few of these traits to any appreciable extent.
1. Has none of these traits - the virtual opposite of 5 - scatterbrained, mercurial (sic), takes chances, extravagant, disarranged.

The differences in Ai3Q scores between those rated high (4 or 5) and those rated low (1 and 2) on the tutor's scale was significant statistically beyond the 1% level. (Mean score of those voted high : 17.71, n=28; mean score of those rated low : 14.36, n=11; $t=3.31$).

Kline concluded that his Ai3Q was a valid, reliable and discriminating measure of the obsessional personality.

As a further development, Kline has produced an "easy reading" version of the Ai3Q for use with subjects "of average vocabulary level and education and below". Here parallel items were written in simplified language and measured by the technique of Flesch (1951). The results indicated that 21 of the new 30 items came into the "very easy" category, 8 into the "easy" and only 1 in the "fairly easy". Clearly, simplification may adversely affect reliability and validity; with a sample of 46 students Kline calculated a split-half reliability of +0.769 and, for validity, a correlation with the original version of +0.733, concluding that the reliability was satisfactory and that the new version was measuring "substantially the same variable as the original".

As the main study in the present research was to involve children, a questionnaire measure of obsessionality had to be selected which was suitable for this population. The existing major instruments had all been designed for use with adults and clearly were inappropriate for children. The only questionnaire which it did seem feasible to employ, in view of its simplified language and vocabulary, was Kline's "easy reading" version of his Ai3Q. (The children's version of the Sandler-Hazari obsessionality inventory constructed by Fontana had not at that time been published.)

However, Kline had advocated that before his "easy reading" version was used, further studies of its validity should be conducted. These were carried out in Chapter 5.

5. RELIABILITY AND VALIDITY OF KLINE'S Ai3Q WITH A SCHOOL POPULATION

General aim: to obtain data on the reliability and validity of the Easy Reading Version of Kline's Ai3Q with specific samples of school children.

A. Study 1

i Sample. The whole of the first year of a comprehensive secondary school in Oxfordshire, covering a wide geographical area with urban, rural and agricultural parts, and with the whole range of social and economic backgrounds. The school was non-selective and the only other school in the area was a small Roman Catholic secondary school, so that in the present sample children of that religious denomination would be under-represented.

The number of children tested was 228 (127 boys, 101 girls); median age: 11 years 10 months.

ii Tests Used

1. Junior Eysenck Personality Inventory (Eysenck, 1965).

This 60 item inventory gives scores on the following three dimensions:

Extraversion - Introversion

Neuroticism - Stability

Lie Scale

2. Children's Personality Questionnaire (Porter and Cattell, 1968).

This normally gives scores on fourteen primary factors. However, on this occasion the B-factor items (measuring intellectual aspects) were omitted as it was felt they would be a hindrance to the motivation and cooperation of the subjects.

Both the above scales were administered orally in order to obviate any difficulties in reading.

3. Teachers' Rating Scale.

A simple scale of six bipolar constructs, each on a seven-point scale, was devised, and completed by the children's year-tutors.

The items were:

Very calm, even tempered	1 2 3 4 5 6 7	Easily upset
Prides self on being very clean	7 6 5 4 3 2 1	Never bothers about being clean
Is never on time for lessons/appointments	1 2 3 4 5 6 7	Always very punctual
Work and dress always neat and tidy	7 6 5 4 3 2 1	Work and dress always very untidy
Never collects things	1 2 3 4 5 6 7	Great collector of objects
Finds it hard to make up his/her mind	7 6 5 4 3 2 1	Comes to decisions quickly

The scale was designed so that high scores would be associated with the more obsessional personality.

4. Ai3Q (Easy Reading Version) (Kline 1971).

This was administered a second time after an interval of six weeks in order to give test-retest data.

iii Test Administration.

The tests were administered in the order JEPI, Ai3Q, CPQ, the first two before the mid-morning break, the CPQ after, partly because of the time differences involved and partly because the JEPI was seen as a useful 'starter' for children being asked questions about themselves, and they would still be relatively

fresh when given the Ai3Q, whilst the CPQ's length dictated its place at the end.

The children were tested in their own classes and in their own classroom bases, approximately 28 children in each of 8 classes.

iv Results.

(a) Ai3Q Mean: 17.72 S.D: 3.25

Retest: Mean: 17.49 S.D: 2.99

Reliability (internal-consistency) : +0.75 (split-half).

Reliability (stability) : +0.66 (test-retest).

(b) Correlations between Ai3Q and other factors.

<u>Factor</u>	<u>r</u>	<u>p</u>
<u>Rating Scale</u>	+0.117	-
<u>J.E.P.I.</u>		
Extraversion	-0.063	-
Neuroticism	-0.043	-
Lie Scale	+0.375	<0.01
<u>C.P.Q.</u>		
A	+0.191	<0.01
C	+0.100	-
D	-0.324	<0.01
E	-0.291	<0.01
F	-0.098	-
G	+0.246	<0.01
H	+0.089	-
I	+0.172	<0.05
J	-0.083	-
N	-0.151	<0.05
O	-0.261	<0.01

Q3	+0.219	<0.01
Q4	-0.262	<0.01

v Discussion.

The data on reliability show that the version of the Kline measure administered to this sample stands up with regard to both internal consistency and stability. The former result of +0.75 (split-half) compares well with Kline's adult version where his results on various small samples varied between +0.62 (n=69) and +0.68 (n=113). As Guilford (1956) has indicated, adequate internal consistency implies adequate test-retest reliability, the latter in this sample being +0.66 which is in fact identical with Kline's result on a sample of 42 university students. The only data on this easy-reading version offered by Kline are a split-half reliability of +0.769 on a sample of 46 students, and a correlation (validity) of +0.733 with the adult version on the same sample.

The present data on validity comprise the correlations between the Kline measure and the three other scales.

The correlations with the teachers' rating scale are positive but small and statistically not significant. It had been expected that if obsessionality as measured by Kline had good construct validity then the obsessionality would be manifested by observable behaviour. It was this behaviour that the teachers' rating scale was attempting to measure. Of course, only taking six items of behaviour compared with the thirty items on the questionnaire was likely to produce a lower correlation, and the reliance upon year-tutors to complete the scales may have compounded the problem. Year-tutors were chosen since they at least "knew" all of the children in their year group, unlike subject teachers

who would have known only the children in their particular sets or streams. However, the year tutors' experience of the children's behaviour was in fact limited to registration and pastoral sessions and so the scale may have been difficult to complete, as indeed a couple of tutors commented. This would then account for the failure of the relationship between the questionnaire and the rating scale to be other than a chance association.

The lack of correlation between obsessionality and both extraversion and neuroticism supports the claim that obsessionality is a separate construct of personality. The statistically significant positive correlation with the Lie Scale requires some explanation. It has been suggested by many people that the Lie Scale is in fact a misnomer. Although it may show up those who are seeking to present themselves in a falsely good light, as a symptom of desirability set response, it may also simply indicate those whose behaviour is genuinely more conscientious and "better". Indeed, in attempting to explain a slight negative correlation between E and L, Eysenck (1965) admits there may be a tendency for introverts to be "better behaved" rather than that they simply lie more. As obsessionals are conscientious, precise, punctual, clean and tidy, they may therefore be generally judged better behaved, and therefore obtain higher scores on the Lie Scale.

The correlations with the C.P.Q. factors are discussed individually:

A+ : $p < 0.01$. This factor relates to a general permeation of all thinking by feeling, a warmhearted, easygoing, casual and careless type of person.

In this respect the positive correlation is a little surprising.

- D- : $p < 0.01$. This factor represents a stoical, deliberate, constant and inactive temperament, generally described by Cattell as phlegmatic. The correlation here is as one might have expected.
- E- : $p < 0.01$. Submissiveness is the key to this factor, which includes such constructs as dependent, considerate, conventional, conforming. The opposite pole is dominant, rebellious and headstrong. From this it will be seen again that the result is as one might expect.
- G+ : $p < 0.01$. This measures "superego strength" and the positive end of the construct is "conscientious, moralistic, consistently ordered, persevering and determined". This type of person is "cautious in thinking before he speaks" and has "good organization of thinking" (Cattell 1969). This seems to describe the obsessional character and parallel Kline's (1971) finding.
- I+ : $p < 0.05$. The positive pole of this construct includes "artistically fastidious, sensitive, tender-minded" which is partly in line with obsessionalism (fastidiousness) and partly not ("acts on intuition, seeks attention").
- N- : $p < 0.05$. As nearly 20 correlations were computed it is possible that this significance level itself arose by chance. (The same is of course true for the factor above). Its size (0.151) further suggests the lack of a true relationship. This "shrewdness" construct is regarded by Cattell (1965) as not being very important in terms of actual behaviour, and is in fact omitted from the H.S.P.Q.
- O- : $p < 0.01$. This factor shows a placid, resilient, self-confident temperament, which would, in the latter

constructs particularly, be descriptive of the
obsessional character.

- Q3+ : $p < 0.01$. High strength of self-sentiment is the label given by Cattell to this factor, which he defines as "controlled, socially precise, compulsive". He further suggests steadiness and purpose, objectivity, balance and decisiveness as correlates of this factor. This again describes several aspects of the obsessional and replicates Kline's (1971) results with an adult sample.
- Q4- : $p < 0.01$. This factor of "ergic tension", negatively correlated with obsessionalism, suggests a relaxed, unfrustrated temperament and is as one would have predicted only when the obsessional is operating within his chosen areas of behaviour.

There are thus nine factors on the C.P.Q. with which there are statistically significant correlations of obsessionalism. All but one are more or less as one might have predicted, but it has to be emphasised that the largest correlation is only just over 0.3, and therefore the relationships are still small, and some doubt can be cast upon the meaningfulness of these correlations. The statistical significance is largely contributed to by the relatively large size of the sample. The largest correlation of +0.38 in fact has a 99% confidence interval of +0.52 to 0.22, so although one can say the obtained r was significant at the 1% level or beyond, the associated confidence interval was fairly wide.

It is also reasonably clear that the C.P.Q. is not measuring all (if any to a great degree) of the facets of

obsessionality measured by Kline's instrument: thus the two seem relatively separate and independent. There is therefore some evidence for the validity of the Kline questionnaire since it is clearly not measuring the same factors as either the C.P.Q. or J.E.P.I., and its face-validity would appear to confirm it as a measure of obsessionality.

B. Study 2

- i Sample. The whole of the second year of a comprehensive secondary school in the metropolitan borough of Solihull, in an area which was formerly Warwickshire. The catchment area for the school was geographically large, with urban, rural and agricultural communities and the whole range of socio-economic backgrounds.

The number of children tested was 140 (63 boys, 77 girls); median age: 13 years 3 months.

ii Tests used.

1. High School Personality Questionnaire (Cattell and Cattell, 1968).

This questionnaire, like the C.P.Q. used in the first study, gives scores on fourteen primary factors.

2. Teachers' Rating Scale.

The same scale was used as is described in the previous study, and completed by year-tutors who knew the children reasonably well.

3. AH4 Test of Intelligence (Heim, 1970)

This group test yields three separate scores: part I (numerical/verbal), part II (spatial), and Total score.

4. Ai3Q (Easy Reading Version) (Kline, 1971).

iii Test administration.

The tests were given in written form following the procedure laid down for each test. The Rating Scale was completed by year tutors at the same time as the other tests. The order of presentation was always Ai3Q, AH4, HSPQ, and the children were tested in their own class groups in their own classroom bases, an average of 28 children in each of 5 classes.

iv Results.

(a) Ai3Q : Mean : 16.57 S.D. : 3.65

Reliability (internal consistency) : +0.58 (Kuder-Richardson).

(b) Correlations between Ai3Q and other factors.

<u>Factor</u>	<u>r</u>	<u>p</u>
<u>Rating Scale</u>	+0.169	<0.05
AH4 (Total)	-0.163	-
<u>H.S.P.Q.</u>		
A	-0.185	<0.05
B	-0.030	-
C	+0.010	-
D	-0.066	-
E	-0.157	-
F	-0.294	<0.01
G	+0.120	-
H	-0.064	-
I	-0.090	-
J	+0.026	-
O	-0.018	-
Q2	+0.105	-
Q3	+0.297	<0.01
Q4	-0.103	-

v Discussion.

The datum on reliability shows that with this sample of children the internal consistency is only adequate, and not as high as that for the first sample, which, using the split-half method, gave a coefficient of reliability of +0.75.

The validity data comprise correlations with other tests, and on this second sample it is immediately evident that far fewer of the correlations reach a level of statistical significance (four out of seventeen, compared with ten out of seventeen for the first sample). This may in part be due to the different tests used (H.S.P.Q. here, C.P.Q. in the first), the administration of the tests (orally in the first sample, written here) or the different size or ages of the samples (228 12-year olds in the first case, 140 13-year olds here). The significant correlations are discussed as follows.

Teacher's Rating Scale: $p < 0.05$. The same rating scale as in the first sample was used, with six bipolar constructs each on a 7 point scale. Year-Tutors who knew the children reasonably well rated each child. The results indicate that there was a significant relationship between the questionnaire responses of the children and the ratings of their observable behaviour by their tutors. The correlation in this second study is only marginally higher than that obtained in the first (+0.169 and +0.117 respectively) and may be associated with the fact that in the second study the ratings were made towards the end of the academic year when presumably the tutors knew their children better. In the first study the ratings were made after one term in the children's first year. One note of caution to be added is that nearly twenty correlations were computed and therefore this level of significance may itself have arisen by chance.

A- : $p < 0.05$. This contrasts with the highly ($p < 0.01$) significant correlation with factor A+ in the first study, when it was remarked that the finding was against

prediction. Here, A- denotes the cool, precise, objective, rigid temperament of what Cattell labels sizothymia. This goes along with aspects of the obsessional's manner - his methodicalness, attention to order, and keeping to well-defined channels of behaviour.

F- : $p < 0.01$. In the first study the correlation with F was also negative, but did not reach statistical significance. This factor, labelled desurgency, denotes a slow, cautious, subdued temperament associated with children who have had an upbringing with exacting standards and who tend to progress to occupational steadiness and seriousness about jobs. This would agree with aspects of the obsessional personality and replicate the finding from Kline's (1971) first validity study with an adult sample.

Q3+ : $p < 0.01$. This agrees completely with the finding in the first study. This controlled, socially precise and compulsive temperament is similar to the traits of the obsessional.

This study, more than the first, indicates that Kline's questionnaire is measuring a different type of personality from that measured by the H.S.P.Q. There are only three significant correlations with factors from the Cattellian measure, and these are all in the direction of expectation, but not in real terms very high (the largest correlation is +0.297) so therefore some doubt must be cast on their meaningfulness. The positive relationship with the teachers' rating scale suggests some evidence for construct validity.

C. Study 3

i Sample. The whole of the first year of a comprehensive secondary school in the Metropolitan Borough of Solihull. The catchment area for this school was largely urban with a proportion rural; the whole range of socio-economic backgrounds was represented.

The number of children tested was 202, of which 93 were boys and 109 girls. Median age was 12 years 4 months.

ii Tests used.

1. Junior Eysenck Personality Inventory (Eysenck 1965).
2. Sandler-Hazari Obsessionality Inventory (Children's Version (Fontana 1980)).
3. Ai3Q (Easy Reading Version) (Kline 1971).

iii Test Administration.

These tests were given in written form, following the standard procedure, in the order Ai3Q, J.E.P.I., S.H.O.I. In order to separate further the two ostensible measures of obsessionality, the first two tests were always administered before the playtime break, and the last afterwards. The children were tested in their own form-rooms in their normal form-groups. There were 8 classes with an average of 25 children in each. All the tests were administered by the writer.

iv Results.

The initial analysis revealed that there was a statistically significant ($p < 0.05$) difference between the girls' and boys' scores on the Ai3Q so it was decided to treat the scores on all the other tests separately for the sexes. In fact from Table 1

the girls appear to achieve higher scores not only on the Kline measure, but also on the Sandler-Hazari Inventory (traits, symptoms and total) and the Lie Scale of the J.E.P.I.

Fontana's (1980) sample of 11½ year old girls also obtained significantly higher mean scores on the Sandler-Hazari trait scale ($p < 0.001$) although not on the symptom scale. Fontana in fact suggests that as girls at this age tend to be more conformist and self-controlled, then "it could be that their personalities are more obsessional during this stage of development than are those of boys" (p.270). It is interesting to note, however, that this sex difference disappears in each of the four non-clinical adult samples employed by Fontana.

A comparison of the results of the present study and Fontana's (Table 3) indicates that the former sample achieved lower mean scores on traits and symptoms for both boys and girls, the greater differences being with boys. However, Fontana's non-clinical adult samples showed a range of mean scores from 7.82 to 10.80 on the trait scale and 6.13 to 8.80 on the symptom scale. It may therefore be that the differences between the present study and Fontana's are within normal sampling variations, although it would be tempting to hypothesise possible reasons for the lower scores of the 1 year-older sample. Further investigations with other age groups within the same geographical area would be necessary before meaningful hypotheses could be erected, however.

Table 4 shows the results of product-moment correlations between pairs of test scores separately for each sex. The significant ($p < 0.01$) relationship between the Ai3Q and the Sandler-Hazari trait scale suggests they are measuring a similar aspect of personality, which is not related to the possession of symptoms.

(non-significant negative correlations). The Ai3Q correlates positively with Eysenck's Lie Scale but at a significant level for girls only. As the Lie Scale may measure a tendency to be better behaved (Eysenck and Eysenck 1963), this association may support Fontana's suggestion that girls tend to be generally more conforming, although with the SHOI Trait Scale the relationship with the Lie Scale is significant for boys ($p < 0.05$) as well as girls ($p < 0.01$).

The SHOI Symptom Scale correlated highly significantly with Neuroticism, suggesting that the two scales are measuring a substantially similar aspect of personality. The relationship between symptoms and introversion for boys may reflect the consistent finding of negative correlations between E and N on the J.E.P.I. (Eysenck 1965) and that between symptoms and N above.

TABLE 1 MEANS, STANDARD DEVIATIONS AND DIFFERENCES BETWEEN THE SEXES

<u>TEST</u>	BOYS (n = 93)		GIRLS (n = 109)		DIFFERENCE	
	<u>MEAN</u>	<u>S.D.</u>	<u>MEAN</u>	<u>S.D.</u>	<u>t</u>	<u>p</u>
Ai3Q	15.97	2.82	17.00	3.22	2.133	<0.05
SHOI Traits	6.84	3.26	9.88	3.11	6.763	<0.001
SHOI Symptoms	8.96	3.60	10.06	3.17	2.309	<0.05
SHOI Total	15.80	5.54	19.94	4.82	5.679	<0.001
JEPI E	18.31	3.47	18.73	3.51	0.582	n.s.
JEPI N	12.97	5.16	13.82	4.51	1.249	n.s.
JEPI L	2.25	1.88	2.90	2.08	2.312	<0.05

TABLE 2

COMBINED DATA FOR TOTAL SAMPLE (n = 202)

<u>TEST</u>	<u>MEAN</u>	<u>S.D.</u>
Ai3Q	16.52	3.08
SHOI Traits	8.48	3.52
SHOI Symptoms	9.55	3.41
SHOI Total	18.03	5.55
JEPI E	18.54	3.49
JEPI N	13.43	4.83
JEPI L	2.60	2.01

TABLE 3

COMPARISON OF PRESENT DATA WITH FONTANA'S (1980)

	<u>PRESENT STUDY</u>		<u>FONTANA (1980)</u>	
<u>BOYS</u>	<u>n = 93</u>		<u>n = 64</u>	
	<u>MEAN</u>	<u>S.D.</u>	<u>MEAN</u>	<u>S.D.</u>
SHOI Traits	6.84	3.26	8.92	3.25
SHOI Symptoms	8.96	3.60	10.27	2.99
<u>GIRLS</u>	<u>n = 109</u>		<u>n = 57</u>	
SHOI Traits	9.88	3.11	10.90	3.00
SHOI Symptoms	10.06	3.17	10.93	3.43

TABLE 4

CORRELATIONAL ANALYSIS

	<u>BOYS (n = 93)</u>		<u>GIRLS (n = 109)</u>	
	<u>r</u>	<u>p</u>	<u>r</u>	<u>p</u>
Ai3Q and SHOI Traits	+0.431	<0.01	+0.367	<0.01
Ai3Q and SHOI Symptoms	-0.203	n.s.	-0.183	n.s.
Ai3Q and SHOI Total	+0.212	<0.05	+0.256	<0.01
Ai3Q and JEPI E	+0.088	n.s.	+0.024	n.s.
Ai3Q and JEPI N	-0.079	n.s.	+0.059	n.s.
Ai3Q and JEPI L	+0.160	n.s.	+0.247	<0.01
SHOI Traits and JEPI E	-0.051	n.s.	-0.074	n.s.
SHOI Traits and JEPI N	+0.078	n.s.	+0.166	n.s.
SHOI Traits and JEPI L	+0.246	<0.05	+0.271	<0.01
SHOI Symptoms and JEPI E	-0.235	<0.05	-0.133	n.s.
SHOI Symptoms and JEPI N	+0.621	<0.001	+0.528	<0.001
SHOI Symptoms and JEPI L	-0.111	n.s.	-0.023	n.s.

D. Conclusions.

The evidence from these three studies suggests that Kline's Ai3Q (Easy Reading Version), when used with first and second year secondary school children, has acceptable reliability and validity. It does not appear to be measuring the same factors as appear on the Cattell and Eysenck inventories and the correlations which did reach statistical significance would seem to represent fairly predictable relationships. The positive correlations with the teachers' rating scale (study 2) and with the Trait Scale of the SHOI (study 3) give further evidence for its being a measure of obsessionality.

It was therefore concluded that this questionnaire could be used to discriminate between groups of children showing a greater or lesser degree of obsessionality, this dimension appearing to be a continuum in the same way as extraversion for example.

It was also clear that in the main experiments the sexes should be treated separately in the data analysis.

6. TWO STUDIES OF COGNITIVE PERFORMANCE.

In Chapter 1 it was postulated that as the obsessional tended to be careful, methodical, neat and cautious, then he would differ from the non-obsessional in tasks involving sorting, classifying and categorising. It is hypothesised that the obsessional will therefore tend to sacrifice speed for accuracy, taking a longer time to carry out such cognitive tasks whilst achieving higher scores for avoiding errors. The aim of the present two studies was to test out whether this is in fact the case in samples of 12 and 13 year old children.

In order to erect specific hypotheses, tasks had to be selected which involved such activities as sorting and categorising with the variables of both speed and accuracy. The first task (OT 13) was chosen as an example of organizing and classifying skills (operational thinking) with accuracy measured against specified time limits. The second (Picture Arrangement) was selected as a measure of planning, and of logical and sequential thinking, where accuracy and speed were separately assessed. The third task (Spiral Maze) involved psychomotor performance where, because of the induced time-stress, the subject is forced in effect to choose between being fast but making errors or being accurate but taking a longer time. The final task (letter cancellation) measured accuracy against time, the subject having to discriminate, select and then cancel with the appropriate mark two different letters in an array of continuous prose within a specified time limit.

As with the maze, the subject has to choose between being fast but inaccurate or slow and accurate.

In Chapter 5 it was shown that children in the specified age-bands could be categorised as high or low obsessionals on the basis of their questionnaire responses. The tasks selected above were all suitable for subjects of this age range so now specific hypotheses concerning these aspects of cognitive performance could be erected and tested.

a. The Tasks.

i Sorting Task OT13

This test was constructed by Ward (1969) and his colleagues as part of the try out of a large pool of items in the proposed Operational Thinking Section of the (then) British Intelligence Scale Project, which later gave birth to the British Ability Scales (Elliott et al. 1978).

The materials comprised 24 cards each $1\frac{1}{2}$ inches square, varying by several attributes. The cards were numbered 1-24 in a small central circle.

The cards' attributes were as follows :

- (a) Outer figure square or diamond.
- (b) Inner figure square or diamond.
- (c) Colour of outer figure (white, red, yellow, green).
- (d) Colour of inner figure (yellow, red, green).
- (e) Edge of outer figure (single or double).
- (f) Edge of inner figure (single or double).

The procedure was to place all 24 cards randomly in front of the subject and to say, "This is a game in which you have to sort these cards out a number of ways. Pay no attention to the numbers - they are only to help me. I shall put out three or four pairs of cards and I want you to look at each pair to see how the two cards are alike in some way and also different from the other pairs. Then I want you to look among the rest of the cards for the cards which are the same as each of the pairs. Let us try this one."

Sort (1): Colour of outer figure. The cards were put out and, leaving at least 3 inches between each of the four pairs, the experimenter said, "Can you see how the ones in each pair are alike in

some way ? Find the ones which go with each pair". If the subject had not grasped the concept after sixty seconds, the experimenter said, "This will help you" and a row of exemplars was added according to a predetermined list (given in Appendix VIII) with any wrong placements being removed. Every thirty seconds an additional new row of exemplars was added and wrong placements removed until the subject verbalised the concept accurately or sorted the remaining cards correctly, in which case the task was discontinued. All four sorts were administered to each subject.

Sort (2): Colour of Inner Figure. Procedure was the same as for (1).

Sort (3): Orientation (inner and outer shape). Procedure was the same as for (1).

Sort (4): Double classification using edges of figures. The procedure was the same as for (1) except that two minutes were allowed before putting out the first row of exemplars.

The score for each subject was obtained by simply adding up the total of exemplars required before the required concept was verbalised, or the cards correctly placed, across all four sorts. As there were 16 cards to be placed on sorts (1),(3) and (4), with 18 on (2), the maximum total score was therefore 66, the minimum zero, with low scores representing successful sorting.

Representations of the cards are given in Appendix IX

ii Picture Arrangement.

This test was taken from the Wechsler Intelligence Scale for Children (Wechsler (1949) in its British form (Saville 1971). It was selected since it measured "planning involving sequential and causal events" (Glasser and Zimmerman 1967, p.76) and "the ability to

manipulate these details logically" (p.79).

It comprises seven items, each having between four and six cards with a picture on, which the subject is required to put into the correct order to make a sensible story. A demonstration item (not scored) precedes them. Each item is timed either until the correct story is demonstrated or the subject indicates that he has arranged the cards to his satisfaction (and not as in the manual where specific time limits are used).

The procedure was that laid down in the Manual for subjects aged 8 or over, and was as follows.

Firstly the demonstration item was given. The three cards were laid out in front of the subject in the predetermined order (as indicated on the reverse of the cards) and was told, "These pictures tell a story about a man who was in a fight. The man lost the fight. As the pictures are arranged now, they are not as they should be. Watch me and see how I arrange them to make the story right". After laying out the cards correctly, the experimenter paused for a moment to enable the subject to study the arrangement, then proceeded with item 1, saying firstly, "Now here I have some other pictures which I want you to arrange. Each time I will put them before you in a mixed-up order. I want you to arrange them in their right order so as to make a sensible story." Before items 2 to 7, the wording was shortened to "Now arrange these in their right order so as to make a sensible story." Timing began immediately the cards had been laid out in their order of presentation.

The only exception to the laid down procedure given by Wechsler (1949) was that every item was given to each subject irrespective of his success on previous items, whereas according to Wechsler the test should normally be discontinued after two consecutive failures. This was done in order to test the children to limits and not penalise them

for perhaps making careless errors, and also to be able to compare validly the results between groups of children in the knowledge that they had all attempted the same number of items.

The scoring system was different from the official system in that it was decided to separate the accuracy and time scores - Wechsler instead gave additional time-bonus points, resulting in a combined single score. In this study, two points were given for correct arrangement and none for an incorrect one, with the exception of item 7 where either of two alternative arrangements gained one point (Wechsler accorded them two points instead of four). The separate time score was the total time taken over the seven items. The criteria for correct arrangements are given in Appendix X.

From this test each subject therefore gained two scores, one for accuracy (from 0 - 14) and one for total time (in seconds).

iii Gibson Spiral Maze

This test was published by Gibson (1965) as a psychomotor test concerned with "measuring the speed, accuracy and general styles of people's muscular responses in response to carefully controlled stimuli" (p.1). It is claimed that psychomotor performance is associated with educational adjustment and that completing this maze is not a matter of intellectual ability. Gibson (op.cit.) presents various studies to back these claims up.

The maze is a design printed on a large card, presenting a spiral pathway 135 cms. in length bordered by heavy black lines. Obstacles, in the form of the letter O, are scattered along the pathway's whole length. Since there are no blind alleyways or alternative pathways, technically the design is not a true maze.

The procedure for administration was exactly as laid down in the Manual and was as follows.

With the Administrator and Subject sitting opposite each other, the maze card was put in front of the Subject with the starting arrow at the centre pointing towards the Administrator's right. The Subject has a pencil with a fairly sharp, hard lead (grade H). The Administrator said, "I want to see how quickly you can go through this maze. There aren't any closed places. You start with your pencil here (pointing to the arrow) and you go round; you mustn't touch these obstacles (pointing to two of them) and you mustn't touch the lines at the side. You go round as quickly as you can, and you come out here". (The Administrator demonstrated the circular motion with his finger.) "Put your pencil on the arrow now - ready - go!"

The stopwatch was started as soon as the Subject began and stopped when he reached the outlet of the maze, the time in seconds being immediately recorded on the card. As the Subject worked, the Administrator held the edge of the card firmly on the table with his finger tips, in order to prevent it moving.

After 15 seconds from the start, the Administrator said quite sharply, "Go as quickly as you can!" Thereafter, at intervals of 15 seconds, further time-stress was induced by saying, "Quickly, now, quickly!", "Quick, quick, quick!" etc in order to hurry the Subject.

The time score was simply the time in seconds which the Subject actually spent in tracing the maze.

The error score was calculated as follows. Every time the pencil touched, but did not penetrate into the side of an obstacle or the lines at the side, the figure 1 was written by the error. Every time the pencil line penetrated into an obstacle or the lines at the side, the figure 2 was written by the error. Penetration was defined as going over the printed surface more than half the thickness of the pencil line. If the pencil line remained in continuous contact with the

printed line for some distance, 1 error point was scored for every inch of contact. If the pencil line penetrated over a distance, 2 points were scored for every inch of length. The error score was the total of the figures recorded.

iv Letter Cancellation

A passage of dense prose was selected at random from the book "The Gulag Archipelago" by Solzhnitsyn. This 500 word passage was typed double-spaced on A4 white paper in one long paragraph. The task was for each letter 'e' to be circled and each letter 'o' to be crossed through, within a time limit of two minutes. (In a previous pilot experiment it was found that two minutes was sufficiently long to maintain interest but not so long that fatigue became a factor, and the end of the 500 words was in fact never approached by any Subject.) The score was simply the number of correct encirclings and crossings through within that time limit, any errors of commission (circling or crossing through wrong letters) or omission ('e's not encircled or 'o's not crossed through) were ignored. Thus the score was one of accuracy compounded by time.

The procedure was as follows. The paper was placed face-down in front of the Subject who had previously been given a pencil. The following instruction was now given: "When I tell you, you are to turn this paper over and you will find a long passage typed on it. You must go through the passage as quickly as you can putting a circle (o) round every letter 'e' and a cross (x) through every letter 'o'. Do not mark any other letter and do not miss out any 'e's or 'o's. You must work as fast as you can as you will only have two minutes." On ascertaining that the subject had understood the instructions (or repeating them if not), the instruction "Turn over and go!" was given and timing with a stopwatch was started immediately the paper was face-up on the table.

At the end of two minutes, the instruction "Stop!" was given.

The score was the total of 'e's correctly circled and 'o's correctly crossed through. The cross and circle did not have to be executed perfectly as long as they and the intention were clear. A mature student later scored all the papers separately to myself and agreement reached on every score.

v The four tasks were administered individually to each subject in the order OT13, Picture Arrangement, Spiral Maze and Letter Cancellation. Rest pauses of three minutes were given between each test in order to reduce possible fatigue or practice effects.

b. Hypotheses

The following hypotheses were erected.

i General hypothesis.

Children with higher obsessiveness scores (on the A13Q) will take more time but be more accurate on cognitive performance tasks than children with lower obsessiveness scores.

ii Specific hypotheses.

(ii-i) On task OT13, children with higher obsessiveness scores will require fewer exemplars, that is obtain a lower total score than children with lower obsessiveness scores.

(ii-ii) On Picture Arrangement, children with higher obsessiveness scores will obtain a higher accuracy score and a higher time score (that is, they will take longer) than children with lower obsessiveness scores.

(ii-iii) On the Spiral Maze, children with higher obsessiveness scores will obtain a lower error score and a higher time score (that is, take longer) than children with lower obsessiveness scores.

(ii-iv) On the Letter Cancellation task, children with higher obsessiveness scores will obtain a lower score (that is, correctly mark fewer letters) than children with lower obsessiveness scores.

(ii-v) Over all tasks, girls will obtain more extreme scores than their male counterparts, that is, where high obsessiveness obtain higher scores than low obsessiveness then the high obsessiveness girls will obtain the highest scores and the low obsessiveness girls the lowest, and where low obsessiveness obtain higher scores than the low obsessiveness girls will obtain the higher scores and the high obsessiveness girls the lowest.

c. Study 1

i Sample

From the total sample of 228 children in Chapter 5, Section A, a subsample was extracted based on the children's scores on Kline's Ai3Q. The fourteen highest and lowest scorers of each sex were selected to form four groups, this being deviated from only when pupils were absent during the experimental period (resulting in the elimination of four children). The four groups were classified as follows (with Ai3Q scores):

- a) High obsessional girls (mean : 22.50, S.D. 1.29);
- b) High obsessional boys (mean : 21.50, S.D. 0.52);
- c) Low obsessional girls (mean : 12.93, S.D. 1.27);
- d) Low obsessional boys (mean : 13.07, S.D. 1.07).

The differences between the girls' and boys' scores within the high and low obsessional groups were not statistically significant (high obsessionals : $t=1.020$, $df=26$, $p>0.05$; low obsessionals : $t=0.119$, $df=26$, $p>0.05$) so the two sexes within each group may be considered to have been drawn from the same population.

The mean age of this subsample was 11.90 years.

ii Results

1. Sorting Task OT13

Table 1 gives the means and standard deviations for each of the four groups.

<u>TABLE 1.</u>			
	<u>MEAN</u>	<u>S.D.</u>	<u>N</u>
High obsessional girls	4.286	5.876	14
High obsessional boys	4.786	4.191	14
Low obsessional girls	9.643	4.343	14
Low obsessional boys	12.214	7.817	14

A two-way analysis of variance (Curr 1982a) was carried out, the results being presented at Table 2.

<u>TABLE 2.</u>					
<u>Source</u>	<u>Sums of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>p</u>
Sex	33.018	1	33.018	0.999	-
Obsessionality	572.161	1	572.161	17.311	<0.001
Interaction	15.018	1	15.018	-	-
Error	1716.786	52	33.051	-	-
Total	2336.982	55	-	-	-

The above data analysis indicates that on this sorting task the high obsessional groups obtained significantly lower scores (that is, required fewer exemplars) than the low obsessional groups. There was no overall significant difference between the sexes nor was there any sex x obsessionality interaction. Within the low obsessional group the difference noted in Table 1 between the sexes did not reach significance, ($t = 0.407$, $df = 26$).

2. Picture Arrangement

2.1. Accuracy

Table 3 summarises the means and standard deviations for each of the four groups.

<u>TABLE 3</u>				
	<u>MEAN</u>	<u>S.D.</u>	<u>N</u>	
High obsessional girls	7.929	1.979	14	
High obsessional boys	8.929	2.165	14	
Low obsessional girls	7.929	2.674	14	
Low obsessional boys	8.643	2.405	14	

The results of a two-way analysis of variance are listed at Table 4.

<u>TABLE 4</u>					
<u>Source</u>	<u>Sums of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>p</u>
Sex	10.286	1	10.286	1.910	-
Obsessionality	0.286	1	0.286	-	-
Interaction	0.286	1	0.286	-	-
Error	280.000	52	5.385	-	-
Total	290.857	55	-	-	-

These results show that on Picture Arrangement (accuracy) there are no significant differences between the high and low obsessional groups or between the sexes and there are no interaction effects.

2.2. Time

The means and standard deviations for each of the four groups are given at Table 5.

<u>TABLE 5</u>			
	<u>MEAN</u>	<u>S.D.</u>	<u>N</u>
High obsessional girls	152.857	53.192	14
High obsessional boys	132.786	48.412	14
Low obsessional girls	100.500	29.630	14
Low obsessional boys	104.286	64.325	14

Table 6 presents the results of a two-way analysis of variance.

<u>TABLE 6</u>					
<u>Source</u>	<u>Sums of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>p</u>
Sex	928.289	1	928.289	-	-
Obsessionality	22882.574	1	22882.574	8.983	<0.01
Interaction	1992.069	1	1992.069	-	-
Error	132454.42	52	2547.200	-	-
Total	158257.36	55	-	-	-

These results indicate that when time only is considered on the Picture Arrangement test there is a significant difference between the scores of the high and low obsessional groups, the former taking longer. The difference between the sexes within the high obsessional group does not in fact attain significance ($t = 0.395$, $df = 26$, $p > 0.05$). There is no interaction effect between the sex and obsessionality.

3. Spiral Maze

3.1 Errors

Table 7 shows the means and standard deviations for each of the four groups when errors only are considered on the Gibson Spiral Maze.

<u>TABLE 7</u>			
	<u>MEAN</u>	<u>S.D.</u>	<u>N</u>
High obsessional girls	3.714	3.518	14
High obsessional boys	7.643	6.134	14
Low obsessional girls	16.429	13.932	14
Low obsessional boys	13.071	10.307	14

A two-way analysis of variance gave the results presented in Table 8.

<u>TABLE 8</u>					
<u>Source</u>	<u>Sums of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>p</u>
Sex	1.143	1	1.143	-	-
Obsessionality	1152.071	1	1152.071	13.154	<0.001
Interaction	185.786	1	185.786	2.121	-
Error	4554.429	52	87.585	-	-
Total	5893.429	55	-	-	-

These data show that the high obsessional children made significantly fewer errors on the maze than the low obsessional children, that there was no overall difference between the sexes and no interaction effect.

3.2 Time

The means and standard deviations for each of the four groups, when time alone is considered, are given at Table 9.

<u>TABLE 9</u>			
	<u>MEAN</u>	<u>S.D.</u>	<u>N</u>
High obsessional girls	61.214	15.817	14
High obsessional boys	44.286	9.825	14
Low obsessional girls	34.929	8.905	14
Low obsessional boys	39.286	10.425	14

A two way analysis of variance gave the results shown in Table 10 below.

<u>TABLE 10</u>					
<u>Source</u>	<u>Sums of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>p</u>
Sex	553.149	1	553.149	4.138	<0.05
Obsessionality	3425.791	1	3425.791	25.628	<0.001
Interaction	1585.780	1	1585.780	11.863	<0.01
Error	6951.000	52	133.673	-	-
Total	12515.720	55	-	-	-

These results show that again the high and low obsessional groups perform significantly differently, the higher group taking more time. There is also a significant difference between the sexes and a significant interaction effect, such that high obsessional girls take most time and low obsessional girls least time, with high obsessional and low obsessional boys respectively falling in between.

4. Letter Cancellation

Table 11 below gives the means and standard deviations for each of the four groups, the scores being the number of letters correctly cancelled.

<u>TABLE 11</u>			
	<u>MEAN</u>	<u>S.D.</u>	<u>N</u>
High obsessional girls	40.571	8.178	14
High obsessional boys	46.714	10.072	14
Low obsessional girls	53.571	12.774	14
Low obsessional boys	44.000	7.942	14

The results of a two-way analysis of variance are presented in Table 12 below.

<u>TABLE 12</u>					
<u>Source</u>	<u>Sums of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>p</u>
Sex	41.144	1	41.144	-	-
Obsessionality	370.287	1	370.287	3.754	-
Interaction	864.284	1	864.284	8.761	<0.01
Error	5129.714	52	98.648	-	-
Total	6405.430	55	-	-	-

On this task the scores are not significantly different between the two sexes or the high or low obsessional groups, but there is a significant interaction effect. The low obsessional girls successfully cancelled most letters, the high obsessional girls the least, with high and low obsessional boys respectively falling in between.

(d) Study 2

(i) Sample

From the original sample of 140 children in Chapter 5 Section B were drawn the top and bottom quarters on the basis of the scores on Kline's Ai3Q. This gave two groups of 35 children each with the sexes unevenly distributed. Splitting the groups into boys and girls gave the following four groups (Ai3Q scores in brackets):

- a. High obsessional girls (n=15; mean : 20.60; SD 1.45);
- b. High obsessional boys (n=20; mean : 20.85; SD 1.39);
- c. Low obsessional girls (n=17; mean : 12.29; SD 1.99);
- d. Low obsessional boys (n=18; mean : 11.28; SD 2.14);

The differences in AiQ scores between the sexes within the high and low obsessional groups were not statistically significant ($t=0.515$ and 1.430 respectively; $df=33$; $p>0.05$ two-tailed test).

The differences in Ai3Q scores between the high and low obsessional groups within each sex were highly significant ($t=13.119$, $df=30$ and $t=16.665$, $df=36$ respectively; $p<0.01$ one-tailed test).

The mean age of this subsample was 13.27 years.

(ii) Results.

1. Sorting Task OT13

The means and standard deviations for each of the four groups are given in Table 13.

TABLE 13			
	<u>MEAN</u>	<u>SD</u>	<u>N</u>
High obsessional girls	2.133	3.662	15
High obsessional boys	2.150	2.720	20
Low obsessional girls	8.941	6.619	17
Low obsessional boys	9.333	8.000	18

The results of a two-way analysis of variance (Curr 1982b) are given in the following Table 14.

TABLE 14					
Source	Sums of Squares	df	Mean Square	F	P
Sex	0.677	1	0.677	-	
Obsessionality	857.500	1	857.500	26.731	<0.001
Interaction	0.670	1	0.670	-	-
Error	2117.225	66	32.079	-	-
Total	2976.072	69	-	-	-

These data indicate that the high obsessional children obtained significantly lower scores (that is, required fewer exemplars) than the low obsessionals. There was no difference between the sexes and no interaction effect.

2. Picture Arrangement

2.1. Accuracy

Table 15 presents the means and standard deviations for each of the four groups.

TABLE 15			
	<u>MEAN</u>	<u>SD</u>	<u>N</u>
High obsessional girls	11.133	2.167	15
High obsessional boys	11.000	2.248	20
Low obsessional girls	9.118	2.176	17
Low obsessional boys	8.889	1.745	18

Table 16 gives the results of a two-way analysis of variance.

TABLE 16					
Source	Sums of Squares	df	Mean Square	F	P
Sex	0.068	1	0.068	-	-
Obsessionality	74.057	1	74.057	16.897	< 0.001
Interaction	0.542	1	0.542	-	-
Error	289.276	66	4.383	-	-
Total	363.943	69	-	-	-

These results show that high obsessional subjects obtained significantly higher scores on accuracy than did low obsessionals. There was no sex difference or interaction effect.

2.2 Time

The means and standard deviations for each of the four groups are shown in Table 17 below.

TABLE 17			
	<u>MEAN</u>	<u>SD</u>	<u>N</u>
High obsessional girls	184.733	66.116	15
High obsessional boys	182.950	76.268	20
Low obsessional girls	117.765	45.074	17
Low obsessional boys	97.889	36.589	18

A two-way analysis of variance gave the following results, presented in Table 18.

TABLE 18					
Source	Sums of Squares	df	Mean Square	F	P
Sex	733.628	1	733.628	-	-
Obsessionality	101536.57	1	101536.57	29.523	< 0.001
Interaction	2747.481	1	2747.481	-	-
Error	226986.72	66	3439.193	-	-
Total	332004.4	69	-	-	-

These results are similar to those found with Picture arrangement accuracy inasmuch as it was obsessionality which was the sole discriminating variable. The high obsessional children obtained significantly higher scores than did low obsessionals, and there was no sex difference or interaction effect.

3. Spiral Maze

3.1 Errors

Table 19 below gives details of the means and standard deviations for each of the four groups.

TABLE 19			
	<u>MEAN</u>	<u>SD</u>	<u>N</u>
High obsessional girls	2.733	3.327	15
High obsessional boys	3.600	3.979	20
Low obsessional girls	14.294	10.752	17
Low obsessional boys	12.778	13.550	18

Table 20 presents the results of a two-way analysis of variance.

TABLE 20					
Source	Sums of Squares	df	Mean Square	F	P
Sex	14.948	1	14.948	-	-
Obsessionality	1851.429	1	1851.429	22.519	<0.001
Interaction	11.592	1	11.592	-	-
Error	5426.374	66	82.218	-	-
Total	7304.343	69	-	-	-

These data indicate that the high obsessional subjects obtained significantly lower scores (that is, made fewer errors) than the low obsessionals. There was no significant sex difference or interaction effect.

3.2 Time

The means and standard deviations for each of the four groups are given in Table 21.

TABLE 21			
	<u>MEAN</u>	<u>SD</u>	<u>N</u>
High obsessional girls	57.600	15.445	15
High obsessional boys	57.500	12.357	20
Low obsessional girls	39.353	9.714	17
Low obsessional boys	40.278	7.218	18

The results of a two-way analysis of variance are shown below in Table 22.

TABLE 22					
Source	Sums of Squares	df	Mean Square	F	P
Sex	35.819	1	35.819	-	-
Obsessionality	5491.433	1	5491.433	42.244	<0.001
Interaction	28.255	1	28.255	-	-
Error	8579.584	66	129.994	-	-
Total	14135.091	69	-	-	-

These results show that, as on Picture arrangement time, the high obsessional children took significantly longer to complete the task than the low obsessional subjects. There was no significant sex difference and no interaction effect.

4. Letter Cancellation

Table 23 below gives the means and standard deviations for each of the four groups.

TABLE 23			
	<u>MEAN</u>	<u>SD</u>	<u>N</u>
High obsessional girls	67.133	15.052	15
High obsessional boys	60.850	14.961	20
Low obsessional girls	65.882	15.668	17
Low obsessional boys	59.444	13.048	18

Table 24 presents the results of a two-way analysis of variance.

TABLE 24					
Source	Sums of Squares	df	Mean Square	F	P
Sex	686.101	1	686.101	3.179	-
Obsessionality	16.523	1	16.523	-	-
Interaction	14.664	1	14.664	-	-
Error	14246.492	66	215.856	-	-
Total	14963.780	69	-	-	-

The results above indicate that there were no significant differences between high and low obsessionals or between the sexes on the scores for this task, nor was there any interaction effect.

5. AH4 Group Task of General Intelligence

5.1 Part I : Verbal/numerical

The means and standard deviations for each of the four groups on this test are given in Table 25.

TABLE 25			
	<u>MEAN</u>	<u>SD</u>	<u>N</u>
High obsessional girls	28.200	14.915	15
High obsessional boys	26.550	11.180	20
Low obsessional girls	30.647	10.332	17
Low obsessional boys	29.833	9.141	18

The results of a two-way analysis of variance are shown in Table 26 below.

<u>TABLE 26</u>					
Source	Sums of Squares	df	Mean Square	F	p
Sex	33.793	1	33.793	-	-
Obsessionality	154.515	1	154.515	1.185	-
Interaction	4.668	1	4.668	-	-
Error	8608.396	66	130.430	-	-
Total	8801.372	69	-	-	-

These results show that there were no significant differences between the sexes or between the high and low obsessional groups on the test scores, nor was there an interaction effect.

5.2 Part II : Diagrammatic/Spatial

Table 27 below shows the means and standard deviations for each of the four groups.

<u>TABLE 27</u>			
	<u>MEAN</u>	<u>SD</u>	<u>N</u>
High obsessional girls	43.200	14.334	15
High obsessional boys	40.650	11.000	20
Low obsessional girls	43.176	9.976	17
Low obsessional boys	43.944	11.700	18

Table 28 gives the results of a two-way analysis of variance.

TABLE 28					
Source	Sums of Squares	df	Mean Square	F	P
Sex	16.589	1	16.589	-	-
Obsessionality	58.523	1	58.523	-	-
Interaction	44.303	1	44.303	-	-
Error	9094.365	66	137.793	-	-
Total	9213.780	69	-	-	-

These data indicate that, as with Part I, there are no significant differences between high and low obsessional subjects or between the sexes and there is no interaction effect.

5.3 Total

The means and standard deviations for each of the four groups are given in Table 29 below.

TABLE 29			
	<u>MEAN</u>	<u>SD</u>	<u>N</u>
High obsessional girls	71.400	28.765	15
High obsessional boys	67.200	20.320	20
Low obsessional girls	73.824	19.790	17
Low obsessional boys	73.778	18.798	18

A two-way analysis of variance was carried out and the results are given in Table 30.

TABLE 30					
Source	Sums of Squares	df	Mean Square	F	P
Sex	97.714	1	97.714	-	-
Obsessionality	403.200	1	403.200	-	-
Interaction	53.504	1	53.504	-	-
Error	31702.381	66	480.339	-	-
Total	32256.800	69	-	-	-

As with Parts 1 and 11, there were no significant differences on these total AH⁴ scores between either the sexes or the high and low obsessional groups, nor was there any interaction effect.

e. Comparison of Study 1 with Study 2.

In the following statistical analysis of the differences in means for each group of subjects on each cognitive task (tables 31 to 36) two-tailed tests of significance were applied rather than one-tailed, although the hypotheses tended to point in a specific direction, since it was felt wiser to err on the side of caution and apply stricter criteria for significance rather than risk falsely accepting results as meaningful, that is not due to sampling. Generally it was considered more prudent to base conclusions on two-tailed tests.

e. Comparison of Study 1 with Study 2

TABULATED SUMMARY OF DIFFERENCES IN MEANS FOR EACH GROUP
ON EACH COGNITIVE TASK

<u>TABLE 31</u>				
<u>OT13</u>				
	<u>Study 1</u>	<u>Study 2</u>	<u>t</u>	<u>SIG</u>
High obsessional girls	4.286	2.133	1.219	n.s.
High obsessional boys	4.786	2.150	2.198	<0.05
Low obsessional girls	9.643	8.941	0.340	n.s.
Low obsessional boys	12.214	9.333	1.029	n.s.

<u>TABLE 32</u>				
<u>PICTURE ARRANGEMENT - ACCURACY</u>				
	<u>Study 1</u>	<u>Study 2</u>	<u>t</u>	<u>SIG</u>
High obsessional girls	7.929	11.133	4.142	<0.01
High obsessional boys	8.923	11.000	2.722	<0.05
Low obsessional girls	7.929	9.118	1.379	n.s.
Low obsessional boys	8.643	8.889	0.410	n.s.

TABLE 33

PICTURE ARRANGEMENT - TIME

	<u>Study 1</u>	<u>Study 2</u>	<u>t</u>	<u>SIG</u>
High obsessional girls	152.857	184.733	1.434	n.s.
High obsessional boys	132.786	182.950	2.164	<0.05
Low obsessional girls	100.500	117.765	1.210	n.s.
Low obsessional boys	104.287	97.889	0.332	n.s.

TABLE 34

SPIRAL MAZE - ERRORS

	<u>Study 1</u>	<u>Study 2</u>	<u>t</u>	<u>SIG</u>
High obsessional girls	3.714	2.733	0.787	n.s.
High obsessional boys	7.643	3.600	2.310	<0.05
Low obsessional girls	16.423	14.294	0.474	n.s.
Low obsessional boys	13.071	12.778	0.069	n.s.

TABLE 35

SPIRAL-MAZE - TIME

	<u>Study 1</u>	<u>Study 2</u>	<u>t</u>	<u>SIG</u>
High obsessional girls	61.214	57.600	0.620	n.s.
High obsessional boys	44.286	57.500	3.313	<0.01
Low obsessional girls	34.929	39.353	1.332	n.s.
Low obsessional boys	39.286	40.278	0.321	n.s.

TABLE 36

LETTER CANCELLATION

	<u>Study 1</u>	<u>Study 2</u>	<u>t</u>	<u>SIG</u>
High obsessional girls	40.571	67.133	6.089	<0.01
High obsessional boys	46.714	60.850	3.109	<0.01
Low obsessional girls	53.571	65.882	2.352	<0.05
Low obsessional boys	44.000	59.444	3.888	<0.01

NOTE 1 Degrees of freedom : High obsessional girls : 27;
high obsessional boys : 32

Low obsessional girls : 29;
Low obsessional boys : 30

NOTE 2 All above t-tests were two-tailed.

7. DISCUSSION

Obsessionality, as measured by Kline's Ai3Q, was the sole discriminating variable in five of the six tasks in Study 2 and in three in Study 1 (though also involved in two others). The six cognitive tasks and the role of obsessionality will now be considered in more detail.

The sorting task OT13 required subjects to sort cards according to four different criteria which have to be elicited on the basis of pairs put out by the experimenter. In both studies, the high obsessional children required fewer exemplars before perceiving and verbalising the criteria of categorisation compared with the low obsessional subjects. Additionally, the scores for each group were lower in Study 2 although only reaching statistical significance in the case of the high obsessional boys. As the later study (2) had children who were on average a year older than in the earlier study (1), one might reasonably expect the scores to differ in this way since cognitive skills generally increase with age, at least in childhood.

According to Pollak (1979) obsessional people display orderliness and are often "fond of indexing, tabulating, organizing and planning and crave accuracy" (p 227), and one could surmise that on this sorting task the high obsessionals' personality attributes made the classifying and categorising required for success both more acceptable and easier.

With adult patients suffering from an obsessional neurosis the opposite case seems to be true, since these subjects tend to be under-inclusive in categorising activities. It was noted in Chapter 2 that Reed (1968) had hypothesised that, given a

classificatory or conceptual task, the obsessional neurotic would be overspecific in his interpretation of the given class and therefore too strict in his acceptance of appropriate class members and attributes. When he used Vigotzky's test of concept formation, he found (Reed 1969c) that the obsessionals allocated fewer members to each class and indeed required more classes; they also displayed more indecision and doubt about categories, perhaps because they could not order the categorisable features they perceived in terms of task relevance and importance. Craig (1965) also found that obsessive-compulsive patients tended to under-include but his sample also made few errors; Hawks (1964), however, found no relationship between over,- or under-inclusion and obsessive-compulsive disorder.

As one of the differences between obsessional neurosis and obsessional personality is the degree to which there is an interference with or hindrance to normal functioning in everyday life (for example, Marks 1965), it is possible that the obsessional neurotics' thinking is hampered by an exaggerated under-inclusion, whereas the subject with obsessional traits, or obsessional personality, is aided by his attributes of orderliness, the ability to organize and the desire to be accurate. Furthermore, these positive attributes would have overcome the time constraints on this particular task (exemplars being put out if the subject did not respond within one or two minutes, depending on the criteria to be identified), whereas obsessional neurotics would have been penalised by their indecisiveness and over-meticulousness.

Originally, the OT13 task was intended for inclusion in a battery of tests forming a scale of intelligence and it might be hypothesised that intelligence was a mediating variable in the results found in these two studies. However, when the AH4 Test of General Intelligence (Heim 1970b) was administered in Study 2, the analysis of variance revealed no significant differences in scores between the sexes or high and low obsessionals, whether it was Part I (Verbal/numerical), Part II (spatial/diagrammatic) or Total score which was examined.

With the Picture Arrangement test the scoring separated accuracy and time, although in the Wechsler Intelligence Scale for Children (Wechsler 1949) they are combined to produce a single score whereby basic accuracy points can be increased by time bonuses. It seemed wise to make the separation as Yates (1966) had identified groups of schoolchildren who were slow but accurate and whose apparent performance level had been severely underestimated by imposed time limits. Furthermore, as it had been hypothesised that high and low obsessional subjects could be discriminated with regard to both speed and accuracy, it was clearly necessary to score them separately here. When speed is considered, the high obsessionals took significantly longer to carry out the tasks in both studies, suggesting that the obsessionals' tendency to inconclusiveness and indecision (for example, Pollak 1979) means that they will tend to use up time checking their work, being afraid of making mistakes and weighing the pros and cons of the decisions they take.

When accuracy, uncontaminated by time, is considered, the high obsessionals did in fact gain higher scores, although only in Study 2. As this study comprised one year older subjects on

average, a difference in scores between the two studies might have been expected but this was not the case with the low obsessives whose scores differed only marginally and non-significantly. Glasser and Zimmerman (1967) describe this test as measuring such factors as "perception, visual comprehension, planning involving sequential and causal events, and synthesis into intelligible wholes" (p76). In view of the obsessional personality's predilection for planning noted above (Pollak, op.cit.), it was predicted that high obsessives would be more accurate particularly when the usual time constraints were lifted. In order to be more successful on this task subjects have to be able to delay their solution until they have examined the situation carefully and reached a decision; they have to be alert to detail and be able to think through situations logically. These are areas in which the high obsessives would be expected to excel.

On the Spiral Maze the high obsessives made significantly fewer errors in both studies and also took significantly longer to complete the maze, although in Study 1 there was also a sex difference and an interaction effect, high obsessional girls taking most time and low obsessional girls the least, with the two male groups inbetween. Gibson's (1965) standardisation data are somewhat sparse when it comes to female samples, so comparisons can only be made with the male samples. Gibson's sample of first year secondary schoolboys (n=76) yielded a median error score of 7, compared with Study 1's means of 7.6 and 13.1, and Study 2's means of 3.6 and 12.8 for high and low obsessional boys respectively, and a median time score of 49 seconds, compared with Study 1's means of 39 and 44 seconds, and Study 2's means of 40 and 47 seconds.

However, as the numbers in the present studies were relatively small (n=14 in Study 1 and n=18 or 20 in Study 2) it is difficult to make meaningful comparisons with Gibson's sample, although the scores in Study 2 appear roughly comparable given the selectivity of the sample, whilst those in Study 1 appear marginally to represent more speed and less accuracy.

Gibson (1969) takes pains to point out that the error score is meaningful only in relation to the score on time - it is not independent or discrete (this does not apply the other way round), since the subject is instructed to go as fast as he can but to make no errors and also the error score has a limitless ceiling with a floor of zero whereas the time score has a limitless ceiling but only with a theoretical floor of zero as time must elapse for the maze to be completed. Nonetheless, Gibson (1965) is in favour of dividing scores on both factors to give four quadrants on a scattergram, with the labels 'slow and accurate', 'quick and careless', 'slow and careless' and 'quick and accurate'. In his first publication on the maze (Gibson 1964) schoolboys judged by teachers to be naughty tended to lie in the quick and careless category, as did delinquent boys. As the previous review of the literature showed that the more obsessional subjects tended to be perhaps better behaved, cautious and conscientious, one would expect the high obsessional to be in the opposite quadrant, slow and accurate, as these results seem to bear out.

When the performance of adult psychiatric patients on the Porteus Mazes (Porteus 1942) is examined, obsessional (or "obsessoid", after Lewis and Mapother 1942) subjects seem to show a slow tempo (Foulds 1951, 1961, Foulds and Caine 1958) in completing the mazes

and in first making a start (Foulds and Owen 1964). Foulds (1953) and Foulds and Caine (1959) had also found that women suffering from psychoneuroses worked more slowly than their male counterparts, hypothesising that the men were more "task-centred". This was not a significant or consistent finding in the studies reported in Chapter 6.

Performance on mazes can of course be affected by other factors such as the circumstances in which they are administered (Martin and Wade 1971) and also by training the subjects to talk to themselves (Meichenbaum and Goodman 1971).

On the letter cancellation task not only is accuracy measured but also speed despite the score being the number of letters correctly cancelled, since there was a time limit of two minutes imposed, and Heim (1970a) claims that the speed/accuracy dichotomy is invalid as the two cannot be separated. Furneaux (1956) had felt that speed, accuracy and "continuance" (similar to persistence) were independent but interacting attributes. This may in part account for the fact that there were no significant differences in either Study 1 or Study 2 between the high and low obsessional groups, although the former study did reveal a significant interaction effect between sex and obsessionality, the high obsessional girls scoring the lowest and the low obsessional girls the highest, with the boys sandwiched inbetween. It had been hypothesised the high obsessionals would obtain lower scores since they would put greater emphasis on accuracy, taking longer to carry out successfully the required cancellations and thereby obtaining a lower score.

An impressionistic look at the response sheets suggests that the low obsessionals in fact marked more letters altogether but included

incorrect ones (error of commission) whereas the high obsessionals marked fewer letters but they were usually right. Having to cancel two letters with different marks clearly added to the differences with the result that overall the scores between the groups did not vary significantly.

When the performance of psychiatric groups on similar tasks has been examined, Himmelweit (1946) found that dysthymics (who typically include obsessional patients) very much preferred accuracy to speed on a variety of pencil and paper tasks including digit cancellation. This particular task was also used by Rachman (1973) whose sample of obsessional patients performed much more slowly than non-obsessional neurotics.

The psychiatric literature has naturally limited itself in general to considering experiments with subjects showing obsessional symptoms rather than obsessional traits, the latter being aspects of otherwise normal personalities. A link between the trait/symptom dichotomy and reversal theory has been postulated by Fontana (1978, 1981). Smith and Apter (1975) put forward a theory of psychological reversals involving a bi-stable model where there was not one preferred state for any person to be in but two. It was felt that although subjects would spend more time in one state than the other, they might reverse between them according to certain kinds of environmental disturbance. The main bipolar state is telic versus paratelic dominance. The telic state is one in which the individual pursues goals seen by him as essential, whereas in the paratelic state the individual concentrates upon the purely diversionary nature of an activity. Within each of these two states could be conditions of high or low arousal. High arousal in the

telic state would result in anxiety whereas low arousal was associated with relaxation. In the paratelic state high arousal meant excitement and low arousal boredom. Smith and Apter (op. cit.) felt that children would normally operate within the paratelic state and adults within the telic, although parents who were over-telic in their bringing up of their children might force them to become too telic-oriented and thereby make them pursue goals such as high standards of skill or attainment or moral compliance.

Fontana (1981) contended that the obsessional personality (showing traits not symptoms) was firmly located in the telic state and could not reverse into the paratelic, but the obsessional neurotic (showing symptoms not traits) would reverse between the telic and paratelic states, neither mode being dominant. In other words, the facility to show reversals was over-inhibited in the obsessional personality and under-inhibited in the obsessional neurotic.

When these theories are considered in relation to the studies presented in Chapter 6, it is possible to conjecture that some of the differences between the two studies, and possibly within each study between tasks, might be associated with both state and level of arousal. For example, although children are considered to function usually within the paratelic state it is possible that high obsessional children perform within the telic, and within that state some high obsessionals will function at one level of arousal and some at the other. Both high arousal (anxiety) and low arousal (relaxation) might interfere with accuracy and speed, with optimum levels perhaps being achieved at moderate levels

of arousal. Further, some low obsessionals would occasionally reverse into the telic state depending on the nature of the task. Thus the high and low obsessional groups might not have been entirely homogeneous, at least in terms of reversal theory.

On the surface it might appear that there is a similarity between the obsessional personality dimension and the reflective-impulsive continuum detailed by Kagan (op, cit.) and his colleagues (summarised in Chapter 3). The high obsessional child would appear to be reflective in his approach to cognitive tasks, operating cautiously, sacrificing speed for accuracy, making fewer errors but taking a longer time. Similar results to those obtained in the present studies have been obtained, for example, by Weithorn et al. (1984) whose reflective group of 6 year olds made fewer than half the errors of the impulsive group on perceptual matching tasks and Porteus Mazes.

However, reflection-impulsivity is one type of cognitive style, whereas obsessionality is one dimension of personality, and, as Fontana (1977) points out, cognitive "style theory" does not concern itself with motivation, or with the possible systems within the personality, such as the ego or the superego, which help to determine why people differ in the degrees of importance which they attach to various categories" (p.145). Personality factors may be seen as wider dimensions within which particular cognitive styles may operate and it may well be that the high obsessional personality is predisposed to a more reflective style of approach to cognitive tasks. It is felt that the obsessional personality dimension in this case is the more useful discriminating factor since the review

of the literature and the evidence in Chapter 5 suggests it plays an important part in both adult and child (at least 10 years onwards) studies, whereas the cognitive style of reflection - impulsivity seems to discriminate best between the ages of 6 and 12 (Mussen, Conger and Kagan 1979).

Theories of perception must be linked with personality if they are to be meaningful, as several writers have mentioned. Thurstone (1944) stated that "the attitudes which the subject adopts spontaneously in making perceptual judgments reflect in some way the parameters that characterise him as a person" (p.6). Bruner (1951) expanded this by contending that a theory of personality would be incomplete without embodying a theory of perception, just as perception could not be understood without broadening perceptual theory to the point where it included personality variables. It was left to Klein (1951) to state that the researchers' target should be a theory about perceivers rather than perception. In the obsessiveness dimension we would appear to have a personality factor which seems to enable us to make certain predictions about perception in particular types of task.

The importance of obsessiveness may be derived from its inclusion as one of seven temperamental factors in Kline's (1980) psychometric model of man, these seven being chosen after a study of at least 100 factors (Kline 1979b). Although Kline (1980) is cautious about his choice of factors he still maintains that the psychometric model of man allows "worthwhile predictions of behaviours even when theoretically incomplete and when using a set of variables that may not be the best obtainable" (p.328).

Certainly in this study obsessionality has been shown to be an important factor in the examination of cognition in children.

8. CONCLUSIONS

- (i) Following Kline's (1967a) evidence that it was possible to develop a reliable and discriminating measure of the anal character or obsessional personality with demonstrated construct validity, the Easy Reading version of his Ai3Q measure (Kline 1971a) was tried out on three samples of secondary schoolchildren and found to have acceptable validity and reliability.
- (ii) When children were divided into high and low obsessionals on the basis of their Ai3Q scores, their performance on various cognitive tasks supported the general hypothesis that high obsessionals tended to be more accurate but slower. However, there were some exceptions suggesting that their performance might be dependent on the precise nature of the task.
- (iii) Certain tasks commonly associated with measuring aspects of intelligence seemed to be associated more with obsessionalism.
- (iv) The performance of the high obsessional children on cognitive tasks appeared to be both quantitatively and qualitatively different from that of the adult obsessional neurotic, perhaps underlining the finding that obsessional traits are not related to obsessional symptoms or to general neuroticism (Kline 1967a, Pollak 1979).
- (v) The obsessional character dimension would seem to be a useful factor to be considered when examining differences in performance across a range of cognitive activities especially in children from the age of 12 upwards.

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APPENDICES

CHAPTER 5 STUDY 1

- I Raw Scores for Whole Study
- II Means and Standard Deviations for Whole Sample

CHAPTER 5 STUDY 2

- III Raw Scores for Whole Sample
- IV Means and Standard Deviations for Whole Sample

CHAPTER 5 STUDY 3

- V Raw Scores, Means and Standard Deviations for Girls
- VI Raw Scores, Means and Standard Deviations for Boys
- VII Raw Scores, Means and Standard Deviations for Whole Sample

CHAPTER 6

- VIII Sorting Task OT 13 : List of Exemplars
- IX Sorting Task OT 13 : Representation of Cards
- X Picture Arrangement : Criteria for correct arrangements
- XI Passage for Letter Cancellation Task

CHAPTER 6 STUDY 1

- XII A Raw Scores on Cognitive Tasks for High Obsessional Girls
- B Raw Scores on Cognitive Tasks for High Obsessional Boys
- C Raw Scores on Cognitive Tasks for Low Obsessional Girls
- D Raw Scores on Cognitive Tasks for Low Obsessional Boys

CHAPTER 6 STUDY 2

- XIII A Raw Scores on Cognitive Tasks for High Obsessional Girls
- B Raw Scores on Cognitive Tasks for High Obsessional Boys
- C Raw Scores on Cognitive Tasks for Low Obsessional Girls
- D Raw Scores on Cognitive Tasks for Low Obsessional Boys

KEY TO SCORES.

<u>TEST.</u>	<u>HIGH SCORE.</u>	<u>LOW SCORE.</u>
<u>J.E.P.1.</u>		
E	extraverted	introverted
N	unstable	stable
L	lying (but see text)	truthful
<u>C.P.Q./H.S.P.Q.</u>		
A	warmhearted	reserved
B	more intelligent	less intelligent
C	emotionally stable	affected by feelings
D	excitable	phlegmatic
E	assertive	obedient
F	happy-go-lucky	sober
G	conscientious	expedient
H	adventurous	shy
I	tender-minded	tough-minded
J	circumspect	vigorous
N	shrewd	forthright
O	apprehensive	self-assured
Q2	self-sufficient	group-dependent
Q3	controlled	casual
Q4	tense	relaxed
<u>Ai3Q</u>	high obsessional	low obsessional
<u>S.H.O.1.</u>		
Traits	more obsessional traits	fewer obsessional traits
Symptoms	more obsessional symptoms	fewer obsessional symptoms
Total	high obsessional	low obsessional
<u>T.R.</u>	high obsessional behaviour	low obsessional behaviour
AH 1	high verbal/numerical skills	low verbal/numerical skills
AH 2	high spatial skills	low spatial skills
AH 3	high general intelligence	low general intelligence
OT13	many exemplars required	few exemplars required
Pict.Arr.A.	higher accuracy	lower accuracy
Pict.Arr.T.	more time taken	less time taken
Spiral Maze-E	more errors made	fewer errors made
Spiral Maze-T	more time taken	less time taken
Letter canc.	higher accuracy/speed	lower accuracy/speed

APPENDIX I

CHAPTER 5 STUDY 1

QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	JEPI			CPQ					
	EX	NE	LI	A	C	D	E	F	G
1	23	16	0	3	5	7	9	10	1
2	18	8	0	7	8	7	5	5	2
3	15	7	8	6	8	5	5	6	3
4	16	13	0	5	5	6	4	4	3
5	7	4	3	7	7	4	9	6	2
6	19	19	2	4	5	8	7	9	5
7	17	9	1	8	7	7	7	6	3
8	18	11	1	5	5	8	8	7	2
9	17	14	2	5	5	8	8	6	2
10	21	16	0	4	7	8	8	8	5
11	19	8	1	10	5	8	8	6	2
12	3	14	3	2	2	4	4	6	2
13	14	16	6	5	5	2	4	5	5
14	15	22	1	4	3	8	5	2	2
15	17	16	0	4	5	7	8	8	2
16	16	6	4	10	8	2	3	4	9
17	16	21	1	2	4	8	5	1	2
18	9	16	0	4	5	9	5	8	2
19	14	21	2	2	4	9	5	7	2
20	16	14	3	5	5	9	5	1	2
21	17	13	1	5	8	6	7	1	4
22	23	03	4	6	7	8	5	5	2
23	15	16	2	3	4	8	7	4	4
24	20	13	2	3	5	7	5	2	2
25	18	8	2	7	6	4	4	4	9
26	18	18	3	5	5	8	1	2	4
27	22	11	2	3	8	4	7	8	2
28	18	5	2	1	5	10	9	9	2
29	23	9	7	5	6	8	10	10	2
30	19	19	3	4	6	8	5	7	2
31	22	9	4	7	8	1	8	9	7
32	21	9	2	6	8	6	8	9	3
33	17	13	4	6	8	7	5	10	3
34	15	13	3	5	4	7	5	8	4
35	16	10	2	2	5	9	9	9	2
36	17	7	2	8	10	3	9	8	2
37	23	17	2	6	5	6	4	8	2
38	19	17	1	6	6	6	5	10	2
39	20	10	1	3	2	8	8	8	1
40	22	5	3	7	6	6	9	10	1

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QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	JEPI			CPQ					
	EX	NE	LI	A	C	D	E	F	G
41	20	4	2	5	5	7	7	8	3
42	17	4	1	6	4	7	9	9	2
43	11	13	4	2	4	10	5	6	2
44	14	7	7	6	5	5	5	1	5
45	14	20	0	4	3	8	5	4	2
46	13	22	2	1	2	10	7	4	1
47	19	19	0	5	4	10	8	10	2
48	20	16	4	4	3	8	5	5	5
49	22	06	3	7	6	7	5	5	5
50	19	14	0	6	8	7	5	8	4
51	14	22	1	7	4	8	4	2	2
52	21	15	0	5	5	5	7	10	2
53	8	22	1	3	1	8	5	9	2
54	19	4	5	7	10	4	5	5	4
55	22	15	1	5	5	9	9	9	2
56	19	17	3	8	5	7	5	8	2
57	20	17	1	6	6	8	7	9	4
58	15	21	2	2	3	7	7	9	2
59	21	6	4	3	8	5	7	7	4
60	15	13	0	3	5	7	8	5	2
61	22	21	3	6	6	8	8	7	3
62	23	16	2	6	5	8	5	10	2
63	22	16	1	6	5	8	9	8	2
64	22	23	1	4	6	7	8	8	5
65	19	11	2	3	7	7	9	8	3
66	18	22	1	7	5	10	8	8	1
67	19	14	1	2	5	8	9	10	1
68	20	16	0	3	4	8	10	8	2
69	18	18	3	5	5	4	7	8	3
70	21	21	2	2	5	8	8	7	2
71	21	16	4	6	4	6	5	5	4
72	23	9	5	8	5	4	5	7	6
73	23	14	5	5	5	6	7	5	2
74	11	22	1	1	2	9	5	2	4
75	18	22	3	1	4	6	5	5	2
76	23	17	4	7	8	6	7	8	2
77	21	12	1	5	5	5	7	5	2
78	7	21	5	3	2	6	5	1	4
79	19	16	4	6	6	9	8	7	1
80	21	18	6	5	8	8	5	4	2

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QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

<u>Child</u>	<u>JEPI</u>			<u>CPQ</u>					
	<u>EX</u>	<u>NE</u>	<u>LI</u>	<u>A</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>
81	12	12	7	5	4	4	3	4	4
82	16	21	5	7	7	9	8	4	2
83	23	11	7	6	7	3	5	5	4
84	13	21	4	4	3	8	5	8	2
85	19	19	10	6	3	4	4	2	6
86	13	19	1	2	1	9	10	10	2
87	14	20	5	5	5	3	4	7	6
88	14	12	0	1	3	8	5	10	3
89	14	24	1	1	1	8	5	7	3
90	20	15	3	1	5	8	10	9	1
91	20	13	2	3	5	8	10	8	2
92	21	7	7	8	10	4	5	7	4
93	18	3	4	6	5	3	3	1	7
94	16	18	3	4	5	8	7	7	2
95	21	11	4	7	6	4	7	6	6
96	21	13	2	2	5	8	8	9	2
97	22	8	3	2	6	8	9	9	4
98	18	17	1	3	7	5	5	7	5
99	17	9	4	7	6	3	8	5	3
100	9	10	7	5	4	8	5	5	4
101	19	20	4	3	10	8	9	5	2
102	22	19	5	3	10	7	9	7	2
103	11	14	4	4	5	8	4	2	2
104	17	21	2	3	6	8	5	5	2
105	21	20	5	1	6	6	4	4	2
106	19	7	5	6	8	5	5	5	5
107	8	16	8	5	5	4	4	1	4
108	15	12	7	6	5	4	4	4	4
109	21	8	3	6	3	6	7	4	2
110	21	9	2	5	7	8	7	6	2
111	18	22	2	5	5	7	4	2	4
112	19	10	1	5	8	4	5	8	4
113	6	10	4	1	5	8	7	6	2
114	19	15	3	4	6	8	4	5	2
115	22	11	0	7	8	9	9	9	2
116	13	17	5	1	4	8	9	8	3
117	23	13	4	6	7	7	9	9	1
118	11	8	2	7	6	6	5	8	4
119	14	17	3	4	5	6	1	8	4
120	13	3	5	6	5	6	4	2	5

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QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	JEPI			CPQ					
	EX	NE	LI	A	C	D	E	F	G
121	24	10	1	7	7	8	8	10	1
122	21	18	3	3	7	8	10	9	2
123	18	22	0	2	6	10	10	10	2
124	16	9	6	8	5	5	5	9	2
125	20	3	0	5	6	6	8	6	2
126	16	13	0	1	4	9	8	8	3
127	18	12	2	5	5	6	5	1	3
128	22	11	5	7	8	3	5	7	2
129	15	10	6	7	6	1	5	5	3
130	4	17	4	1	1	6	3	1	6
131	12	18	3	8	1	7	7	7	1
132	17	18	0	4	5	8	7	7	2
133	18	14	3	7	7	7	9	10	2
134	15	15	4	5	5	7	4	8	5
135	15	7	4	5	7	5	5	9	2
136	23	6	0	6	6	7	5	9	2
137	13	20	0	1	3	8	5	7	5
138	17	3	1	8	5	4	5	5	5
139	16	16	1	3	3	8	9	9	1
140	18	18	3	1	3	8	7	9	2
141	16	14	3	5	5	6	5	5	4
142	18	24	1	4	5	8	9	7	1
143	21	20	0	3	5	9	10	8	1
144	22	19	1	4	7	8	8	7	3
145	18	21	8	5	5	4	5	8	4
146	19	7	2	4	6	9	7	4	1
147	6	17	6	1	1	5	4	1	1
148	11	18	2	3	4	7	4	1	2
149	22	10	5	4	5	7	8	7	2
150	18	24	1	3	3	9	5	2	2
151	21	10	3	7	5	8	5	5	4
152	20	19	0	7	5	7	8	8	3
153	18	9	3	6	7	7	5	7	5
154	6	19	6	3	2	5	3	1	4
155	14	12	3	1	5	8	8	7	2
156	20	15	6	1	6	6	8	10	2
157	22	5	4	6	8	5	8	9	5
158	16	14	2	4	4	5	5	6	3
159	19	11	3	3	10	5	8	10	2
160	10	13	3	5	5	7	7	8	4

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QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

<u>Child</u>	<u>JEPI</u>			<u>CPQ</u>					
	<u>EX</u>	<u>NE</u>	<u>LI</u>	<u>A</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>
161	8	13	6	4	3	5	7	6	3
162	19	14	2	5	6	8	10	9	4
163	15	17	0	3	5	8	8	9	1
164	15	7	7	5	6	6	7	6	5
165	20	13	1	6	6	7	9	9	2
166	19	16	0	6	5	8	10	10	2
167	22	15	4	2	6	8	8	8	4
168	23	4	4	6	5	8	7	7	6
169	14	20	2	6	2	6	5	7	5
170	9	21	3	2	1	5	1	4	3
171	22	23	1	5	7	8	7	5	3
172	23	9	3	6	6	6	9	9	2
173	14	18	2	5	5	5	3	1	2
174	15	16	2	3	3	8	7	4	2
175	12	8	9	2	4	6	4	7	1
176	14	10	4	7	7	5	3	4	2
177	23	11	3	8	7	7	5	7	4
178	14	16	5	5	5	4	3	1	5
179	19	13	4	5	4	7	7	6	2
180	18	8	6	8	7	4	3	4	5
181	21	9	8	5	6	5	5	6	2
182	16	11	6	3	5	6	9	6	3
183	8	18	2	3	4	7	5	7	2
184	17	18	3	5	5	5	3	5	4
185	18	8	5	8	7	6	7	7	3
186	17	15	3	6	5	5	5	8	5
187	20	11	2	5	6	8	8	6	1
188	15	15	1	4	5	8	7	8	1
189	20	17	5	4	8	4	8	9	3
190	18	17	2	6	5	6	5	8	2
191	11	12	3	4	5	8	8	5	2
192	13	10	7	6	7	3	7	10	3
193	17	10	5	6	5	8	8	9	5
194	19	15	9	10	5	1	4	6	5
195	18	18	6	5	4	6	5	8	7
196	24	5	3	7	5	6	8	9	4
197	20	19	4	8	6	8	5	7	2
198	13	21	10	2	5	7	5	1	2
199	19	13	5	4	4	6	5	1	4
200	11	18	4	5	3	8	5	1	4

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QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	JEPI			CPQ					
	EX	NE	LI	A	C	D	E	F	G
201	23	13	4	7	7	6	4	7	3
202	13	8	3	3	5	7	9	2	2
203	17	21	4	6	5	4	8	7	2
204	21	8	3	6	5	8	8	6	2
205	20	16	5	5	5	7	8	7	2
206	17	16	3	4	7	4	5	8	5
207	15	18	2	3	4	5	7	8	3
208	19	15	2	3	6	8	10	9	2
209	20	13	1	3	4	8	5	10	2
210	21	12	1	7	5	8	10	9	3
211	22	12	2	5	6	7	10	8	2
212	20	18	5	5	7	8	5	10	2
213	19	10	0	7	5	8	9	9	1
214	13	23	0	1	1	8	5	6	2
215	17	9	2	5	5	9	9	10	1
216	9	11	5	6	5	7	5	4	3
217	21	10	7	8	7	7	1	6	6
218	19	10	0	5	7	9	10	9	2
219	13	18	2	2	5	8	7	9	2
220	21	16	4	7	5	6	7	4	2
221	19	4	8	8	7	1	5	5	6
222	17	20	2	4	5	4	5	5	2
223	22	20	0	5	7	8	9	9	2
224	20	4	4	2	6	6	10	8	3
225	19	16	2	7	7	8	5	6	4
226	17	23	1	4	4	7	3	5	2
227	18	16	0	2	3	8	8	8	2
228	19	16	0	6	5	6	8	9	2

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QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	CPQ							Ai3Q		TR
	H	I	J	N	O	Q3	Q4	AQ	AQ2	
1	4	1	7	10	8	1	7	13	12	20
2	5	4	5	3	5	5	8	17	17	28
3	4	4	6	8	4	6	9	22	19	27
4	3	3	9	8	8	3	7	19	19	29
5	8	8	4	4	1	7	6	22	19	27
6	2	6	7	9	5	2	8	22	19	29
7	5	1	6	9	5	4	10	16	14	29
8	2	5	5	5	10	4	9	14	16	26
9	4	3	8	9	7	3	9	15	21	29
10	6	5	7	5	8	4	8	13	14	30
11	2	3	7	7	5	3	10	18	12	30
12	3	5	5	9	9	1	3	21	12	30
13	3	7	5	4	5	6	7	14	14	31
14	1	9	8	6	8	4	10	14	14	32
15	6	6	6	7	7	6	7	14	15	26
16	6	9	2	5	4	7	1	16	15	25
17	1	9	10	9	9	2	10	15	15	26
18	3	6	9	7	7	5	8	14	12	29
19	2	6	9	10	10	4	10	14	10	23
20	4	5	8	6	7	5	8	14	15	25
21	6	9	10	5	7	5	8	12	12	27
22	7	6	5	5	4	7	7	19	23	27
23	2	5	7	5	7	5	6	14	14	23
24	7	6	6	5	6	4	9	14	14	30
25	5	9	7	5	5	6	6	16	17	23
26	1	6	7	7	7	6	8	18	18	25
27	7	2	5	7	8	2	5	13	19	29
28	3	3	8	8	9	2	10	13	16	26
29	5	5	7	8	5	4	5	19	19	20
30	4	4	7	6	5	4	7	19	21	24
31	9	4	6	6	5	5	2	18	16	22
32	5	3	4	6	5	5	4	16	16	23
33	2	4	5	7	5	8	5	17	19	23
34	4	1	8	7	6	4	7	15	17	25
35	4	3	7	7	8	3	10	15	18	19
36	5	4	6	7	2	5	7	21	19	26
37	2	3	5	9	6	5	9	21	21	25
38	2	4	6	9	6	4	9	21	17	18
39	2	2	8	10	8	3	9	17	18	23
40	9	1	6	7	5	5	5	18	15	22

APPENDIX I

CHAPTER 5 STUDY I

QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	CPQ							A13Q		TR
	H	I	J	N	O	Q3	Q4	AQ	AQ2	
41	6	4	5	6	5	4	6	18	21	22
42	8	5	6	8	7	3	7	13	14	26
43	4	7	9	9	10	3	10	20	17	24
44	5	4	10	9	6	6	5	19	18	24
45	2	7	8	8	9	3	10	16	13	29
46	2	4	9	9	9	2	9	15	15	29
47	1	3	8	8	6	4	8	12	15	23
48	4	8	6	4	9	6	7	18	16	29
49	6	5	2	4	5	6	5	16	16	28
50	2	6	8	5	5	8	6	21	18	18
51	2	7	7	5	9	4	8	13	13	23
52	4	2	1	6	7	4	6	19	19	26
53	2	7	7	6	9	2	9	18	18	22
54	6	8	4	5	4	6	8	20	22	30
55	6	3	7	8	9	4	9	20	16	30
56	5	4	8	9	7	5	6	21	21	26
57	5	4	5	9	5	3	9	12	11	25
58	2	5	7	9	10	4	10	18	17	29
59	8	5	5	6	5	8	7	19	16	26
60	5	4	7	10	5	4	7	19	19	25
61	4	2	8	10	6	5	6	22	21	30
62	6	3	5	6	6	4	10	18	18	25
63	4	1	6	9	8	1	7	16	17	27
64	6	6	7	8	4	6	7	15	15	30
65	6	3	9	9	5	4	7	20	18	28
66	1	4	8	8	6	4	8	17	19	27
67	6	3	6	10	6	2	9	21	20	30
68	5	2	9	10	8	3	9	19	20	21
69	3	3	6	9	4	4	5	19	22	27
70	3	4	9	9	7	3	10	15	15	34
71	2	4	6	8	9	5	7	19	18	20
72	6	6	5	7	5	5	7	17	18	24
73	5	5	5	7	5	4	6	19	20	24
74	1	9	9	9	10	4	7	20	20	27
75	2	4	9	6	9	4	9	17	16	29
76	5	3	7	6	4	5	9	17	18	29
77	4	4	4	8	5	4	7	18	15	21
78	1	9	9	4	7	4	8	22	21	30
79	4	4	6	8	8	2	9	13	13	29
80	3	9	9	8	5	6	8	22	24	32

APPENDIX I

CHAPTER 5 STUDY I

QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	CPQ							Ai3Q		TR
	H	I	J	N	O	Q3	Q4	AQ	AQ2	
81	7	8	6	5	7	6	5	26	22	31
82	3	5	8	9	6	5	10	16	17	30
83	6	4	4	5	4	8	6	18	18	25
84	3	4	9	7	7	3	6	20	18	26
85	5	6	6	6	10	4	5	18	18	31
86	1	5	9	9	10	3	9	14	14	31
87	5	5	6	4	5	6	6	19	16	27
88	6	4	8	9	8	5	7	14	16	28
89	1	3	10	10	10	1	8	18	16	23
90	3	2	7	10	5	2	9	12	14	33
91	4	3	4	8	7	2	10	15	15	31
92	9	9	6	4	4	7	5	21	20	25
93	7	8	6	3	5	7	2	17	17	31
94	3	6	5	10	8	4	9	11	13	25
95	7	5	5	6	1	6	8	16	17	25
96	5	1	8	8	6	4	7	16	19	22
97	5	3	6	9	6	4	8	16	17	20
98	5	5	6	6	5	7	9	19	19	29
99	6	4	5	5	5	4	6	21	21	24
100	3	7	8	6	5	4	6	24	20	23
101	4	4	7	8	6	4	8	22	21	32
102	3	5	6	9	2	4	7	19	19	29
103	3	8	8	5	6	5	7	15	19	30
104	5	3	5	7	6	4	6	19	19	31
105	7	4	6	7	4	3	8	18	18	24
106	7	9	4	6	4	7	7	19	17	27
107	4	9	6	9	5	4	10	18	18	30
108	4	10	7	5	6	6	5	23	23	30
109	6	4	6	8	8	5	8	13	13	28
110	8	6	5	6	6	3	8	16	16	28
111	1	5	9	5	5	4	10	15	19	30
112	6	6	8	10	5	4	6	22	23	29
113	4	4	8	4	4	5	8	17	18	24
114	3	5	7	7	6	10	8	16	17	30
115	6	3	2	9	4	3	8	16	13	28
116	6	2	9	10	8	3	9	18	17	28
117	6	1	4	6	5	3	2	18	18	23
118	4	2	7	5	4	3	9	16	16	30
119	6	3	5	8	7	2	7	22	21	28
120	7	6	4	5	7	6	7	16	15	26

APPENDIX I

CHAPTER 5 STUDY I

QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	CPQ							A13Q		TR
	H	I	J	N	O	Q3	Q4	AQ	AQ2	
121	8	3	6	10	4	4	8	19	17	27
122	6	1	7	10	6	2	7	18	18	25
123	3	3	8	8	8	2	8	17	14	20
124	9	1	7	7	1	6	8	14	14	21
125	6	7	4	7	4	7	9	13	13	27
126	3	5	6	5	9	6	10	17	15	26
127	5	9	7	6	6	8	9	18	18	28
128	6	7	4	6	5	7	5	16	17	23
129	9	8	6	8	5	6	7	23	21	23
130	1	5	8	8	8	5	5	20	22	22
131	6	3	9	10	10	4	10	16	15	27
132	3	5	6	8	8	6	8	16	15	22
133	5	5	6	4	5	6	6	19	19	29
134	3	8	8	6	5	5	9	22	20	29
135	7	3	5	5	4	7	4	19	20	30
136	9	5	7	5	4	4	6	16	16	31
137	3	7	7	9	9	3	10	18	18	32
138	9	5	6	6	5	5	4	13	14	24
139	2	4	6	9	8	2	10	13	16	19
140	1	5	9	10	7	2	8	20	21	30
141	5	10	8	4	6	6	8	20	22	32
142	4	2	9	9	10	1	10	10	13	21
143	4	5	9	9	7	3	9	9	13	26
144	5	8	10	6	5	7	10	19	19	26
145	5	6	9	8	5	4	6	24	24	25
146	4	8	8	5	8	5	9	20	17	27
147	2	8	9	7	10	3	7	10	12	27
148	2	7	9	8	9	3	5	13	13	32
149	7	3	4	7	5	4	4	20	18	29
150	1	5	10	9	10	2	10	20	17	26
151	10	2	4	7	5	6	5	20	17	29
152	4	4	5	7	7	6	3	19	16	29
153	7	3	4	6	6	7	3	18	18	29
154	4	5	9	6	8	6	5	24	22	21
155	8	5	6	8	4	5	10	16	16	24
156	4	3	8	10	8	3	8	21	20	23
157	9	1	4	7	5	5	6	20	20	24
158	3	6	8	8	5	5	7	14	12	28
159	9	4	4	6	5	4	5	14	15	24
160	3	5	4	10	7	5	6	17	17	26

APPENDIX I

CHAPTER 5 STUDY I

QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	CPQ						AizQ		TR	
	H	I	J	N	O	Q3	Q4	AQ		AQ2
161	3	2	8	9	7	4	9	19	19	27
162	4	3	6	9	5	4	7	17	15	24
163	6	1	8	10	9	2	10	16	16	26
164	9	3	4	4	5	4	3	17	18	22
165	6	1	5	8	5	3	9	18	19	21
166	5	4	6	4	6	4	8	16	17	23
167	3	2	8	10	5	4	8	16	14	29
168	8	2	5	10	4	4	6	21	23	22
169	3	5	7	6	6	5	8	17	15	25
170	2	6	8	5	8	4	7	15	12	25
171	5	5	6	5	6	8	7	20	20	28
172	6	4	5	6	5	5	5	17	17	28
173	7	10	7	9	6	6	7	22	20	22
174	5	6	8	8	8	2	8	15	17	26
175	5	3	4	7	7	5	4	20	18	32
176	9	10	6	8	6	7	6	22	21	29
177	6	5	6	6	7	4	5	23	21	29
178	3	8	8	5	7	4	5	21	16	28
179	5	6	6	7	7	4	7	13	14	27
180	6	6	4	5	5	7	5	24	22	30
181	8	3	8	8	4	3	6	25	25	31
182	1	3	4	5	5	4	9	19	22	31
183	1	7	8	8	9	5	6	19	20	34
184	2	7	7	6	10	5	5	19	16	24
185	7	1	6	10	4	3	9	20	22	33
186	7	2	7	7	6	4	8	23	23	25
187	4	1	5	9	5	4	8	17	19	34
188	3	4	10	10	8	4	10	15	15	25
189	7	1	6	6	5	4	5	19	20	27
190	4	2	6	7	9	5	7	18	17	34
191	4	6	6	6	5	4	9	18	18	30
192	5	2	6	6	1	5	6	22	20	29
193	8	4	8	7	4	6	6	22	23	27
194	5	10	5	3	4	5	5	23	19	25
195	4	6	6	7	6	6	6	22	20	36
196	7	5	5	4	2	5	5	19	19	29
197	8	1	6	7	5	5	6	19	21	36
198	2	9	9	6	6	5	5	21	21	31
199	4	7	7	7	6	7	6	21	20	35
200	3	5	8	7	5	4	8	21	20	28

APPENDIX I

CHAPTER 5 STUDY I

QUESTIONNAIRE SCORES FOR WHOLE SAMPLE

Child	CPQ							Ai3Q		TR
	H	I	J	N	O	Q3	Q4	AQ	AQ2	
201	6	7	7	8	5	5	7	18	16	28
202	1	5	8	6	6	2	9	21	20	33
203	3	5	8	6	5	3	9	22	20	30
204	5	6	6	9	5	4	9	23	19	30
205	4	1	5	8	5	2	7	18	18	29
206	7	3	4	5	2	5	4	18	17	31
207	4	5	4	5	8	4	7	19	19	29
208	7	3	9	10	6	4	8	10	16	25
209	6	2	7	10	6	3	8	18	18	29
210	5	3	8	8	6	3	7	16	16	32
211	6	2	6	8	5	4	7	17	17	28
212	6	3	8	10	5	6	6	20	18	29
213	6	2	6	9	6	3	6	12	12	27
214	2	4	6	10	10	3	10	17	17	23
215	3	1	7	9	8	4	9	14	14	28
216	3	4	7	7	5	4	7	14	15	30
217	6	4	4	6	2	7	5	20	20	30
218	6	2	7	10	5	3	6	15	17	27
219	4	5	7	10	6	3	9	15	15	29
220	3	10	7	6	6	5	8	25	24	29
221	7	9	5	3	5	6	4	22	23	29
222	1	8	9	8	5	3	10	22	22	29
223	3	6	9	9	6	6	9	11	11	29
224	5	5	7	9	7	4	8	11	11	29
225	5	8	6	6	6	6	9	16	19	27
226	3	7	9	6	7	2	6	18	15	30
227	1	5	6	6	8	4	8	21	20	30
228	4	4	6	10	6	4	6	15	17	29

KEY: E = Extraversion Scale
 N = Neuroticism Scale
 L = Lie Scale
 A-Q4 = Cattell's Scales (sten-scores)
 AQ = Ai3Q
 AQ2 = Ai3Q retest
 TR = Teacher's Rating Scale

APPENDIX II

CHAPTER 5 STUDY 1

QUESTIONNAIRE MEANS AND STANDARD DEVIATIONS FOR WHOLE SAMPLE

	E	N	L	AQ	AQ2	TR
MEAN :	17.37	13.96	2.99	17.72	17.49	27.03
S.D. :	4.20	5.26	2.21	3.25	2.99	3.54

Number in whole sample = 228

KEY: E = J.E.P.I. Extraversion Scale
N = J.E.P.I. Neuroticism Scale
L = J.E.P.I. Lie Scale
AQ = Ai3Q
AQ2 = Ai3Q retest
TR = Teachers' Rating Scale

APPENDIX III

CHAPTER 5 STUDY 2

RAW DATA FOR WHOLE SAMPLE

HSPQ

<u>Subject</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>	<u>J</u>	<u>O</u>	<u>Q2</u>	<u>Q3</u>	<u>Q4</u>
1	8	5	10	4	4	7	7	6	3	9	3	2	7	3
2	4	4	4	3	4	6	5	4	4	5	6	6	5	5
3	6	4	4	3	4	1	5	3	8	5	10	8	6	6
4	1	5	4	4	4	5	7	1	5	8	5	6	4	6
5	2	7	10	6	7	7	7	5	4	8	6	6	4	7
6	9	3	4	7	4	7	7	7	2	4	8	3	6	6
7	8	7	8	6	6	6	6	6	8	1	8	5	3	5
8	3	4	6	6	7	5	4	6	3	2	8	3	6	4
9	8	5	7	3	5	5	7	6	2	4	3	4	8	6
10	6	2	6	2	5	5	7	7	6	6	4	8	7	4
11	4	5	6	6	2	5	6	2	4	9	7	8	2	5
12	10	3	4	7	5	7	1	10	2	6	3	4	7	7
13	7	5	6	6	4	9	9	8	7	8	7	4	5	6
14	8	7	8	5	6	2	8	7	8	4	8	5	8	4
15	7	6	1	10	3	8	6	9	6	8	6	2	6	9
16	4	6	4	7	5	4	8	2	8	7	7	7	9	7
17	3	4	6	5	8	6	7	5	2	7	2	8	8	5
18	3	7	6	5	7	6	6	6	6	9	6	4	6	6
19	4	6	4	6	9	6	7	3	6	7	2	5	2	6
20	4	3	5	6	4	3	3	7	4	8	6	4	4	6
21	6	6	3	8	4	4	6	3	7	6	3	5	3	5
22	6	6	6	4	6	6	8	6	9	7	7	6	9	7
23	4	5	9	4	4	7	5	9	8	4	6	6	7	9
24	6	4	3	5	5	5	8	5	9	3	10	6	7	4
25	4	4	9	6	8	7	4	7	3	6	5	6	3	5
26	7	6	3	2	7	5	5	6	1	4	5	6	7	7
27	4	7	7	6	8	4	5	5	3	4	6	5	5	6
28	6	3	8	8	6	5	10	7	4	7	8	6	6	7
29	7	3	6	4	2	8	5	8	2	6	5	6	3	6
30	3	7	7	3	10	2	6	5	6	9	6	10	5	1
31	6	6	8	9	10	5	5	4	5	5	5	5	8	5
32	8	6	8	6	8	6	4	8	6	5	2	4	5	3
33	6	1	7	7	5	3	4	5	7	7	7	8	5	4
34	8	5	2	8	5	6	6	7	7	7	7	4	5	10
35	5	4	6	8	6	8	4	4	4	6	10	5	3	7
36	6	5	9	4	8	9	5	7	3	6	4	7	3	5
37	2	6	3	7	5	3	5	3	8	9	10	6	5	9
38	6	4	6	9	7	6	8	6	6	5	3	1	7	4
39	3	4	6	5	5	2	10	8	5	5	5	8	5	9
40	6	5	5	6	10	4	6	5	5	9	8	4	7	8
41	4	5	4	6	2	5	7	6	5	8	8	6	8	5
42	5	7	7	7	4	1	7	3	7	4	2	5	7	8

APPENDIX III

CHAPTER 5 STUDY 2

RAW DATA FOR WHOLE SAMPLE

Subject	<u>HSPQ</u>													
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>	<u>J</u>	<u>O</u>	<u>Q2</u>	<u>Q3</u>	<u>Q4</u>
43	5	4	6	5	8	8	5	5	5	4	7	5	3	6
44	8	3	7	3	5	7	7	9	8	5	3	2	5	1
45	5	3	5	8	4	4	7	6	7	5	2	4	5	6
46	6	1	5	5	7	7	7	7	8	8	5	3	4	6
47	4	5	7	5	10	6	2	4	8	5	6	3	3	3
48	1	7	7	5	4	1	7	1	6	7	5	9	7	4
49	7	4	4	5	5	9	2	6	6	9	9	2	1	6
50	1	4	6	6	6	5	5	3	5	6	5	5	6	9
51	4	4	2	8	7	5	6	2	6	5	10	8	7	10
52	3	5	7	7	7	5	3	10	6	4	6	3	3	10
53	7	5	5	5	8	7	8	7	4	6	6	5	3	4
54	9	5	10	3	9	8	10	6	4	2	5	3	9	3
55	4	4	5	4	4	7	9	7	3	7	2	3	6	6
56	7	7	7	9	5	9	10	5	8	6	4	1	5	5
57	7	6	5	9	3	9	5	5	7	3	7	6	4	8
58	2	6	5	5	7	4	4	2	4	9	7	10	5	8
59	7	5	6	3	8	9	5	6	5	1	9	6	6	6
60	7	5	2	6	5	4	3	1	7	4	8	1	5	6
61	6	5	4	9	7	5	8	1	8	5	6	5	5	2
62	7	4	3	6	7	10	2	8	5	5	3	3	4	7
63	3	6	7	4	5	8	6	7	3	5	8	2	7	3
64	8	3	10	4	6	5	9	7	2	6	6	8	6	5
65	6	6	10	1	9	5	4	8	4	8	3	8	5	3
66	9	4	6	7	8	9	4	10	5	3	7	3	2	6
67	7	9	3	8	7	8	5	8	3	7	5	6	4	8
68	3	6	5	10	1	6	4	4	9	7	6	7	2	10
69	6	5	3	6	4	7	5	4	6	6	5	6	5	4
70	6	5	8	6	10	7	9	7	2	8	8	4	7	4
71	5	4	5	8	6	8	3	6	5	1	6	5	3	7
72	6	6	4	7	4	6	1	8	5	6	4	7	6	10
73	1	5	8	3	8	9	3	5	1	4	5	8	7	5
74	7	4	5	7	5	7	6	5	5	5	6	3	3	7
75	5	7	5	3	6	7	5	8	4	7	5	5	10	5
76	4	4	3	7	5	9	7	4	7	6	9	6	7	6
77	5	7	6	8	6	6	10	9	3	2	2	4	7	4
78	9	4	8	6	8	9	6	9	5	4	6	3	1	8
79	5	4	7	5	7	4	5	6	4	7	5	8	6	4
80	5	6	2	9	7	7	5	6	3	6	6	5	3	5
81	7	4	8	3	7	5	4	6	4	5	4	4	7	4
82	5	5	9	8	5	4	8	4	6	6	7	7	7	5
83	7	4	5	7	5	5	6	6	7	7	9	7	6	7
84	3	6	10	5	8	7	3	7	1	6	3	9	3	7
85	8	6	6	7	9	8	6	8	6	5	6	1	4	5
86	7	6	9	5	8	6	7	8	3	6	4	4	7	5

APPENDIX III

CHAPTER 5 STUDY 2

RAW DATA FOR WHOLE SAMPLE

	<u>HSPQ</u>													
<u>Subject</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>	<u>J</u>	<u>O</u>	<u>Q2</u>	<u>Q3</u>	<u>Q4</u>
87	7	5	6	7	6	9	4	8	4	4	2	4	3	9
88	6	7	7	7	5	6	10	7	4	7	6	4	5	7
89	7	7	5	4	7	10	7	7	6	2	5	6	5	4
90	7	4	8	6	4	5	7	7	8	4	5	5	4	5
91	6	2	8	7	8	6	5	6	4	7	6	5	4	5
92	7	5	6	3	7	9	6	8	1	4	5	4	6	3
93	3	7	7	7	7	5	9	4	8	4	7	9	8	6
94	4	3	5	6	8	5	6	6	6	8	8	4	3	6
95	4	4	7	4	5	6	5	6	8	4	4	5	8	5
96	5	9	8	10	8	8	5	6	7	7	5	4	5	6
97	3	5	8	1	4	7	8	8	4	4	5	7	10	4
98	6	4	5	7	7	4	5	4	6	3	10	10	7	4
99	6	4	8	5	10	8	9	7	6	8	5	5	8	5
100	5	6	8	8	6	5	6	8	6	5	6	5	5	5
101	4	2	5	5	7	4	5	7	6	4	4	4	6	5
102	5	3	4	7	6	7	10	5	9	7	9	9	5	9
103	3	4	7	5	4	6	1	4	8	8	8	8	3	6
104	8	6	10	1	3	1	10	7	6	4	4	8	10	1
105	4	3	6	9	3	4	4	3	6	8	4	6	3	3
106	1	3	6	4	4	2	6	2	8	9	6	8	4	7
107	7	4	7	8	9	10	4	7	7	2	5	3	2	6
108	6	5	5	4	9	7	5	8	5	1	1	4	5	4
109	4	4	7	4	4	2	7	5	5	4	9	6	6	3
110	2	7	6	8	10	6	6	6	7	6	9	8	8	6
111	6	5	6	4	8	6	10	4	6	4	8	4	8	5
112	7	5	8	5	8	6	7	7	6	5	3	6	8	3
113	5	3	6	3	9	7	5	7	5	4	5	4	6	3
114	3	5	7	7	6	5	2	6	4	4	3	5	3	5
115	9	6	5	8	8	9	7	5	6	5	6	3	5	7
116	9	6	9	5	5	4	8	7	1	4	1	6	6	4
117	1	4	3	9	4	4	4	7	6	7	8	5	5	7
118	7	3	8	6	6	5	4	6	5	5	7	4	7	5
119	6	6	3	5	6	6	9	7	5	6	8	3	6	7
120	9	5	7	7	8	7	10	9	5	4	7	6	7	1
121	2	4	6	3	4	3	4	3	1	1	4	7	5	1
122	2	3	2	3	10	7	3	5	3	5	5	6	3	6
123	6	7	6	6	5	5	5	6	3	4	6	5	4	4
124	3	6	8	5	7	6	5	7	3	6	5	5	6	8
125	8	6	8	8	6	3	8	6	6	4	8	5	7	5
126	7	5	4	6	6	4	6	6	8	6	5	6	5	5
127	3	4	4	3	8	6	5	6	6	5	5	1	8	3
128	7	7	9	6	9	10	5	7	6	4	4	3	4	5

APPENDIX III

CHAPTER 5 STUDY 2

RAW DATA FOR WHOLE SAMPLE

<u>Subject</u>	<u>HSPQ</u>													
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>	<u>J</u>	<u>O</u>	<u>Q2</u>	<u>Q3</u>	<u>Q4</u>
129	4	3	7	5	6	8	7	6	4	9	6	3	5	7
130	4	3	8	6	8	5	5	6	4	7	6	6	5	5
131	7	6	4	5	6	5	8	7	7	4	2	4	9	4
132	7	6	6	4	6	10	5	10	6	6	4	5	8	4
133	4	3	6	9	5	5	3	7	8	7	10	6	7	6
134	2	6	4	6	7	4	9	3	4	10	5	7	6	7
135	3	3	6	5	5	3	7	2	5	10	5	9	4	6
136	6	1	7	5	8	5	4	7	4	8	6	9	5	5
137	4	1	7	6	7	7	4	6	5	7	6	1	3	5
138	4	4	3	4	8	7	5	4	3	5	4	5	3	4
139	8	2	7	5	10	5	5	5	7	9	6	6	3	4
140	10	5	3	5	9	10	7	10	5	5	4	3	4	6

APPENDIX III

CHAPTER 5 STUDY 2

RAW DATA FOR WHOLE SAMPLE

<u>Subject</u>	<u>Ai3Q</u>	<u>TR</u>	<u>AH1</u>	<u>AH2</u>	<u>AH3</u>
1	12	30	33	51	84
2	16	26	14	33	47
3	20	28	33	40	73
4	16	24	31	39	70
5	15	32	36	48	84
6	18	34	24	36	60
7	18	31	29	51	80
8	15	36	19	49	68
9	20	32	37	58	95
10	14	23	22	54	76
11	14	35	33	44	77
12	17	24	32	46	78
13	20	31	25	38	63
14	17	32	35	61	96
15	18	32	30	50	80
16	20	27	37	47	84
17	19	29	31	50	81
18	15	25	41	40	81
19	14	24	17	34	51
20	18	29	06	16	22
21	16	35	25	57	82
22	09	35	36	45	81
23	10	21	18	19	37
24	18	18	25	37	62
25	15	27	27	50	77
26	16	23	40	51	91
27	21	22	40	49	89
28	14	24	40	49	89
29	18	27	15	31	46
30	14	28	42	49	91
31	11	30	37	43	80
32	19	25	33	28	61
33	07	27	13	35	48
34	12	27	30	40	70
35	19	25	37	49	86
36	13	22	29	59	88
37	17	27	19	43	62
38	22	26	36	46	82
39	20	21	35	46	81
40	18	27	26	38	64
41	20	26	17	43	60
42	23	27	50	62	112

APPENDIX III

CHAPTER 5 STUDY 2

RAW DATA FOR WHOLE SAMPLE

<u>Subject</u>	<u>Ai3Q</u>	<u>TR</u>	<u>AH1</u>	<u>AH2</u>	<u>AH3</u>
43	16	28	15	22	37
44	21	26	25	53	78
45	14	27	34	51	85
46	08	23	29	56	85
47	07	25	21	42	63
48	22	27	44	62	106
49	13	25	46	64	110
50	22	23	13	23	36
51	15	30	23	46	69
52	18	28	24	37	61
53	17	21	20	35	55
54	17	26	35	50	85
55	18	25	28	36	64
56	13	18	27	39	66
57	14	14	29	42	71
58	20	29	20	33	53
59	07	21	34	43	77
60	17	23	35	41	76
61	17	26	15	37	52
62	11	17	39	45	84
63	19	32	25	37	62
64	22	26	13	24	37
65	16	23	46	54	100
66	10	24	42	48	90
67	16	27	40	49	89
68	16	23	18	26	44
69	11	13	18	30	48
70	19	29	24	43	67
71	13	23	29	47	76
72	16	24	24	41	65
73	13	20	21	38	59
74	17	29	26	43	69
75	19	29	26	44	70
76	17	30	20	44	64
77	22	30	25	39	64
78	15	20	33	44	77
79	13	26	12	21	33
80	18	25	35	59	94
81	18	26	31	46	77
82	19	29	34	45	79
83	15	30	33	53	86
84	18	27	25	45	70
85	11	27	27	36	63
86	15	23	35	59	94

APPENDIX III

CHAPTER 5 STUDY 2

RAW DATA FOR WHOLE SAMPLE

<u>Subject</u>	<u>Ai3Q</u>	<u>TR</u>	<u>AH1</u>	<u>AH2</u>	<u>AH3</u>
87	13	23	42	49	91
88	12	29	39	52	91
89	17	23	31	46	77
90	13	25	22	40	62
91	20	27	10	29	39
92	13	23	41	58	99
93	15	17	24	40	64
94	18	26	07	24	31
95	22	25	21	33	54
96	20	27	49	60	109
97	21	24	26	55	81
98	23	30	22	39	61
99	20	20	54	62	116
100	18	28	25	30	55
101	24	30	05	00	05
102	18	26	26	36	62
103	17	26	16	16	32
104	16	27	39	53	92
105	17	27	14	35	49
106	18	27	19	30	49
107	11	30	35	43	78
108	11	22	39	50	89
109	23	27	03	07	10
110	13	27	44	58	102
111	15	30	13	22	35
112	23	23	13	32	45
113	19	25	19	32	51
114	15	26	15	39	54
115	13	30	31	48	79
116	18	30	38	49	87
117	20	22	08	20	28
118	23	30	11	32	43
119	17	28	34	38	72
120	15	29	17	24	41
121	20	24	10	40	50
122	20	27	18	18	36
123	12	33	38	44	82
124	14	28	13	22	35
125	17	28	20	29	49
126	16	33	29	34	63
127	19	21	31	29	60
128	15	31	45	52	97

APPENDIX III

CHAPTER 5 STUDY 2

RAW DATA FOR WHOLE SAMPLE

<u>Subject</u>	<u>Ai3Q</u>	<u>TR</u>	<u>AH1</u>	<u>AH2</u>	<u>AH3</u>
129	18	32	11	24	35
130	15	28	17	31	48
131	20	31	32	40	72
132	24	29	47	58	105
133	21	30	13	34	47
134	15	25	14	24	38
135	16	30	18	29	47
136	18	30	18	32	50
137	15	27	29	40	69
138	18	31	38	43	81
139	18	23	10	20	30
140	12	28	29	30	59

KEY: TR = Teacher's Rating Scale
AH1 = AH4 Intelligence Test Part I
AH2 = AH4 Intelligence Test Part II
AH3 = AH4 Intelligence Test (Total)
HSPQ = Cattell's High School Personality Questionnaire
(Sten-scores)

APPENDIX IV

CHAPTER 5 STUDY 2

MEANS AND STANDARD DEVIATIONS FOR WHOLE SAMPLE (n=140)

	Ai3Q	TR	AH1	AH2	AH3
MEAN:	16.57	26.35	27.04	40.57	67.61
SD:	3.65	4.48	10.80	12.03	21.64

	A	B	C	D	E	F	G	H
MEAN:	5.39	4.79	6.01	5.71	6.26	5.94	5.91	5.91
SD:	2.13	1.12	2.03	1.96	2.00	2.10	2.11	2.03

KEY:

TR = Teacher's Rating Scale

AH1 = AH4 Intelligence Test Part I

AH2 = AH4 Intelligence Test Part II

AH3 = AH4 Intelligence Test (Total)

HSPQ = Cattell's High School Personality Questionnaire
(Sten-scores)

APPENDIX IV

CHAPTER 5 STUDY 2

MEANS AND STANDARD DEVIATIONS FOR WHOLE SAMPLE (n=140)

	I	J	O	Q2	Q3	Q4
MEAN:	5.24	5.64	5.69	5.24	5.39	5.51
SD:	1.99	2.04	2.12	2.07	1.96	1.95

APPENDIX V

CHAPTER 5 STUDY 3

QUESTIONNAIRE RAW SCORES, MEANS AND STANDARD DEVIATIONS FOR GIRLS

<u>SUBJECT</u>	<u>Ai3Q</u>	<u>J.E.P.I.</u>			<u>SANDLER-HAZARI</u>		
		<u>E</u>	<u>N</u>	<u>L</u>	<u>Traits</u>	<u>Symptoms</u>	<u>Total</u>
1	13	11	20	4	15	16	31
2	16	20	18	2	13	12	25
3	19	17	21	7	13	10	23
4	17	22	16	3	9	12	21
5	18	15	15	3	11	10	21
6	19	24	16	2	10	8	18
7	19	19	10	6	12	12	24
8	18	19	13	4	15	10	25
9	16	21	13	3	9	8	17
10	16	19	13	2	7	7	14
11	16	20	11	3	11	10	21
12	13	21	12	3	15	10	25
13	19	18	24	3	12	15	27
14	18	21	19	1	8	13	21
15	21	15	16	8	14	9	23
16	19	19	16	1	10	13	23
17	16	21	8	2	10	4	14
18	18	22	8	3	12	7	19
19	16	16	18	5	11	11	22
20	15	21	12	1	10	12	22
21	15	21	18	1	10	12	22
22	19	15	8	4	7	15	22
23	19	19	8	2	8	6	14
24	19	18	18	0	6	11	17
25	21	18	13	6	14	5	19
26	15	15	21	2	10	13	23
27	21	6	14	2	10	12	22
28	16	10	19	2	6	14	20
29	16	24	6	5	12	7	19
30	19	20	3	4	8	9	17
31	9	21	6	1	5	8	13
32	15	14	21	4	9	13	22
33	14	23	11	3	10	11	21
34	17	13	7	2	8	7	15
35	18	17	18	0	6	10	16
36	18	22	8	3	10	10	20
37	15	23	13	2	8	12	20
38	22	15	14	3	11	5	16
39	18	20	12	8	5	5	10
40	13	19	13	0	14	11	25
41	12	19	13	0	8	11	19

J.E.P.I.SANDLER-HAZARI

<u>SUBJECT</u>	<u>Ai3Q</u>	<u>E</u>	<u>N</u>	<u>L</u>	<u>Traits</u>	<u>Symptoms</u>	<u>Total</u>
42	16	21	12	2	10	8	18
43	15	24	19	4	5	9	14
44	13	14	20	4	12	12	24
45	19	20	13	3	9	11	20
46	18	17	12	3	7	9	16
47	14	19	8	1	12	8	20
48	11	18	12	0	2	5	7
49	14	21	15	0	2	11	13
50	12	21	17	2	8	9	17
51	18	19	24	2	6	14	20
52	16	23	22	0	12	8	20
53	7	15	11	4	4	5	9
54	20	17	18	0	13	14	27
55	23	19	18	5	15	9	24
56	22	23	11	3	7	14	21
57	21	18	21	3	16	16	32
58	16	13	14	1	8	10	18
59	21	23	15	5	8	12	20
60	13	18	18	0	8	12	20
61	18	20	8	6	11	7	18
62	17	21	16	0	4	12	16
63	18	12	17	8	12	12	24
64	20	18	19	0	13	11	24
65	19	18	11	1	13	11	24
66	17	22	5	2	9	6	15
67	17	17	20	1	11	10	21
68	20	22	6	5	9	6	15
69	19	19	12	0	14	11	25
70	18	21	15	4	10	7	17
71	19	21	15	6	9	15	24
72	19	20	16	4	11	11	22
73	16	20	12	2	15	7	22
74	12	21	15	4	9	10	19
75	21	17	13	5	14	13	27
76	22	21	18	6	13	12	25
77	20	20	15	4	14	12	26
78	18	19	20	6	13	17	30
79	17	20	9	0	11	6	17
80	20	22	17	4	12	11	23
81	20	16	14	5	14	8	22
82	16	10	15	0	8	9	17
83	21	13	18	3	13	9	22
84	15	10	12	6	9	11	20
85	18	16	15	1	6	10	16
86	21	20	6	3	10	6	16
87	21	23	9	6	12	10	22
88	15	20	15	8	15	15	30
89	19	21	13	2	12	7	19
90	15	21	14	4	10	16	26
91	16	17	11	1	8	19	27
92	14	21	15	0	8	13	21
93	22	17	14	2	9	9	18

<u>SUBJECT</u>	<u>J.E.P.I.</u>				<u>SANDLER-HAZARI</u>		
	<u>Ai3Q</u>	<u>E</u>	<u>N</u>	<u>L</u>	<u>Traits</u>	<u>Symptoms</u>	<u>Total</u>
94	19	22	9	3	7	12	19
95	24	23	13	4	14	11	25
96	19	16	17	5	13	10	23
97	19	20	6	5	10	0	10
98	8	22	13	3	9	12	21
99	12	16	8	1	11	16	27
100	17	19	4	2	5	5	10
101	10	15	15	3	11	13	24
102	12	23	13	5	2	11	13
103	15	14	19	0	8	13	21
104	19	23	16	3	12	6	18
105	14	22	13	4	8	6	14
106	14	13	7	4	8	3	11
107	16	22	16	0	10	13	23
108	17	20	15	2	6	8	14
109	16	20	9	1	6	7	13
MEAN:	17.00	18.73	13.82	2.90	9.88	10.06	19.94
S.D.	3.22	3.51	4.51	2.08	3.11	3.17	4.82

APPENDIX VI

CHAPTER 5 STUDY 3

QUESTIONNAIRE RAW SCORES, MEANS AND STANDARD DEVIATIONS FOR BOYS

<u>SUBJECT</u>	<u>Ai3Q</u>	<u>J.E.P.I.</u>			<u>SANDLER-HAZARI</u>		
		<u>E</u>	<u>N</u>	<u>L</u>	<u>Traits</u>	<u>Symptoms</u>	<u>Total</u>
1	12	21	1	2	3	2	5
2	15	17	19	0	3	10	13
3	15	20	17	0	6	15	21
4	12	15	15	0	6	12	18
5	14	16	9	2	8	6	14
6	14	21	15	2	8	13	21
7	14	19	12	3	6	9	15
8	20	19	7	0	6	6	12
9	19	18	12	0	5	9	14
10	19	22	23	4	10	9	19
11	21	22	13	1	10	5	15
12	15	23	11	0	3	6	9
13	16	20	3	6	8	6	14
14	16	12	10	2	5	9	14
15	21	22	19	1	9	13	22
16	17	18	16	2	10	15	25
17	14	16	13	2	7	12	19
18	14	16	12	3	5	13	18
19	17	18	16	1	10	10	20
20	17	10	17	1	7	12	19
21	17	8	19	4	11	10	21
22	17	22	7	4	7	6	13
23	15	17	15	1	4	9	13
24	20	17	13	6	11	8	19
25	23	19	21	4	6	16	22
26	14	24	11	2	7	10	17
27	18	20	17	3	9	13	22
28	22	20	15	2	12	6	18
29	17	17	15	0	9	12	21
30	16	19	9	1	12	11	23
31	18	19	12	5	9	15	24
32	15	24	14	1	6	8	14
33	16	22	7	1	7	7	14
34	18	18	21	1	13	16	29
35	16	15	16	1	9	13	22
36	18	17	17	2	5	12	17
37	22	15	16	3	12	11	23
38	14	11	11	2	5	7	12
39	16	20	9	2	6	6	12
40	12	19	6	4	2	2	4
41	14	19	18	1	8	10	18

J.E.P.I.SANDLER-HAZARI

<u>SUBJECT</u>	<u>Ai3Q</u>	<u>E</u>	<u>N</u>	<u>L</u>	<u>Traits</u>	<u>Symptoms</u>	<u>Total</u>
42	17	18	18	6	9	9	18
43	12	17	20	4	1	4	5
44	14	20	16	2	5	10	15
45	14	16	16	5	8	13	21
46	16	17	15	1	3	13	16
47	12	12	21	0	13	13	26
48	15	18	13	3	7	7	14
49	15	19	15	3	15	16	31
50	15	17	16	0	0	12	12
51	15	17	13	0	3	13	16
52	17	21	7	1	5	2	7
53	17	15	12	3	5	10	15
54	19	14	15	8	5	5	10
55	21	16	3	6	12	5	17
56	12	19	20	3	11	12	23
57	19	19	7	3	7	4	11
58	15	21	13	4	8	11	19
59	17	17	15	2	7	9	16
60	16	17	4	3	8	5	13
61	15	17	8	4	3	3	6
62	13	15	17	1	0	7	7
63	17	20	16	0	8	13	21
64	18	21	12	0	7	6	13
65	17	21	1	4	5	0	5
66	20	22	4	3	13	6	19
67	19	23	5	2	9	5	14
68	20	17	8	4	13	7	20
69	19	21	13	6	13	10	23
70	16	20	23	4	10	10	20
71	11	7	22	6	9	15	24
72	14	16	15	0	4	7	11
73	18	20	14	4	8	13	21
74	18	22	15	2	7	13	20
75	16	18	10	0	4	10	14
76	14	21	22	3	3	8	11
77	15	18	11	0	5	5	10
78	14	21	6	1	2	6	8
79	12	16	17	0	4	8	12
80	19	17	14	3	3	9	12
81	13	22	9	2	5	2	7
82	15	23	5	2	9	5	14
83	20	18	9	1	7	8	15
84	11	22	20	1	4	8	12
85	9	18	17	0	4	10	14
86	11	23	8	1	2	6	8
87	15	21	14	1	5	9	14
88	12	15	13	1	4	7	11
89	13	21	12	0	6	9	15
90	15	20	3	4	3	8	11
91	14	18	10	6	3	8	11
92	16	8	13	4	10	7	17
93	18	24	12	0	7	12	19

<u>SUBJECT</u>	<u>J.E.P.I.</u>				<u>SANDLER-HAZARI</u>		
	<u>Ai3Q</u>	<u>E</u>	<u>N</u>	<u>L</u>	<u>Traits</u>	<u>Symptoms</u>	<u>Total</u>
MEAN:	15.97	18.31	12.97	2.25	6.84	8.96	15.80
S.D.:	2.82	3.47	5.16	1.88	3.26	3.60	5.54

APPENDIX VII

CHAPTER 5 STUDY 3

QUESTIONNAIRE MEANS AND STANDARD DEVIATIONS FOR WHOLE SAMPLE

	<u>J.E.P.I.</u>				<u>SANDLER-HAZARI</u>		
	<u>Ai3Q</u>	<u>E</u>	<u>N</u>	<u>L</u>	<u>Traits</u>	<u>Symptoms</u>	<u>Total</u>
MEAN :	16.52	18.54	13.43	2.60	8.48	9.55	18.03
S.D. :	3.08	3.49	4.83	2.01	3.52	3.41	5.55

Total number in sample : 202

APPENDIX VIII

SORTING TASK OT 13: LIST OF EXEMPLARS

SORT (1): Colour of Outer Figure

	<u>RED</u>	<u>YELLOW</u>	<u>WHITE</u>	<u>BLUE</u>
First Pair	9	6	18	22
	19	5	4	2
<hr/>				
Exemplars	17	13	11	1
	2	23	14	10
	24	8	3	20
	16	15	21	7
<hr/>				

SORT (2): Colour of Inner Figure

	<u>BLUE</u>	<u>YELLOW</u>	<u>RED</u>
First Pair	24	15	9
	16	23	13
<hr/>			
	19	21	4
	3	8	22
	10	17	20
Exemplars	18	1	11
	5	12	14
	2	7	6
<hr/>			

SORT (3): Orientation

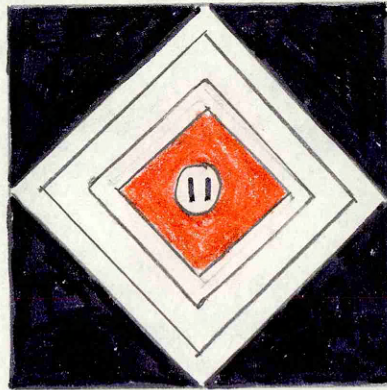
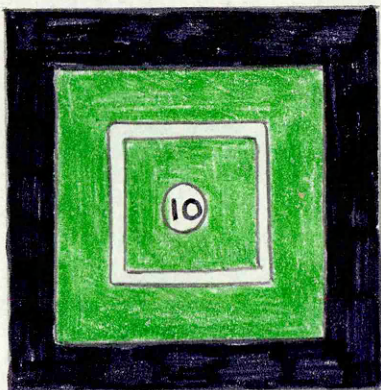
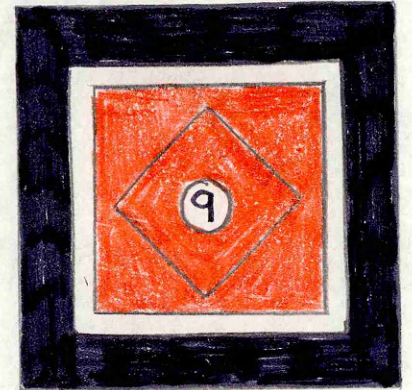
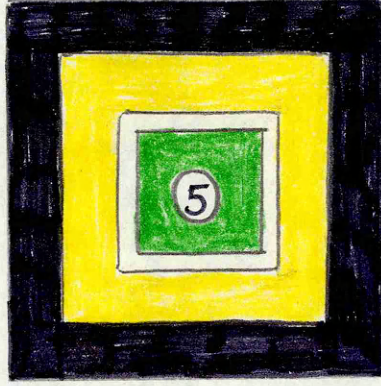
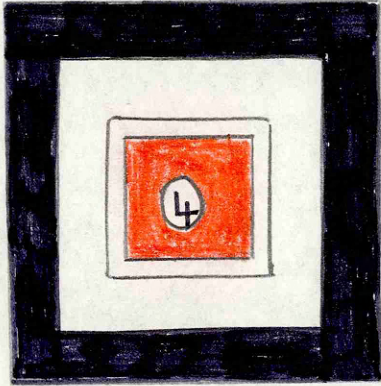
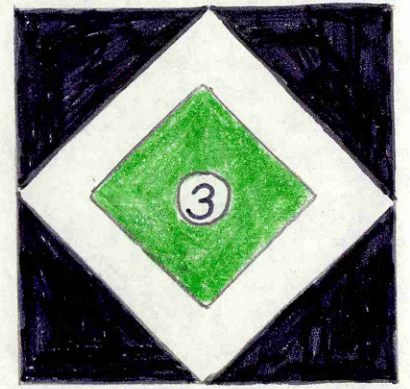
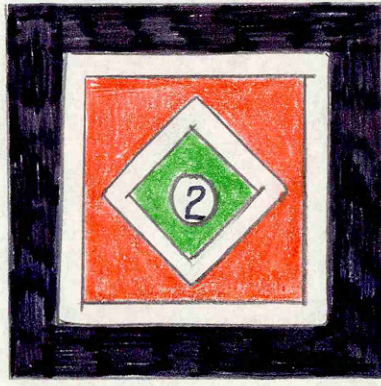
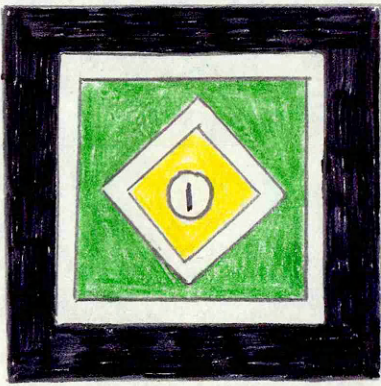
<u>OUTER</u> :	<u>SQUARE</u>	<u>DIAMOND</u>	<u>DIAMOND</u>	<u>SQUARE</u>
<u>INNER</u> :	<u>SQUARE</u>	<u>DIAMOND</u>	<u>SQUARE</u>	<u>DIAMOND</u>
First Pair	5	18	19	9
	4	15	13	1
	23	11	12	22
Exemplars	21	8	17	24
	10	3	20	7
	14	6	16	2

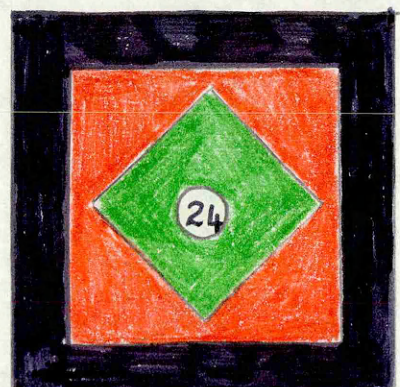
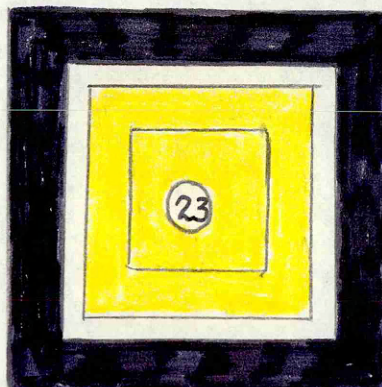
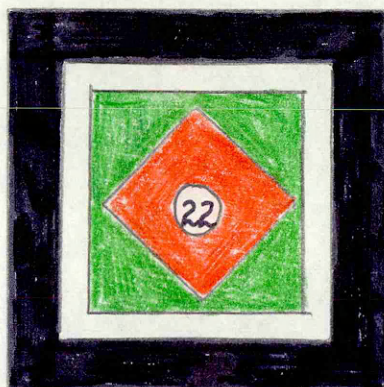
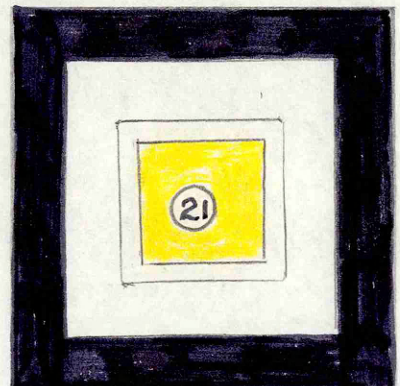
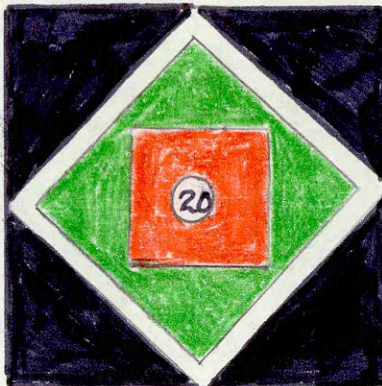
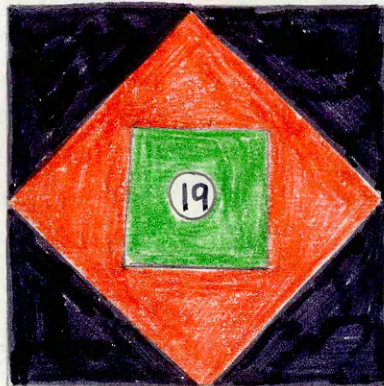
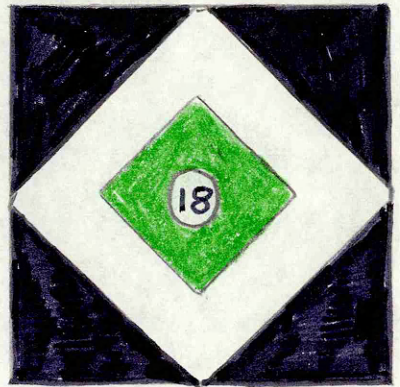
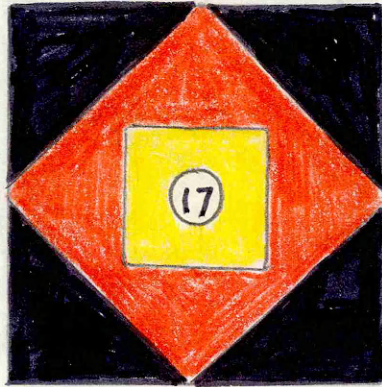
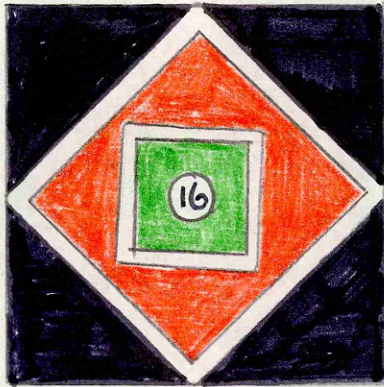
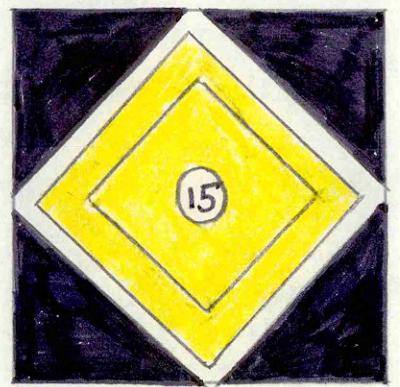
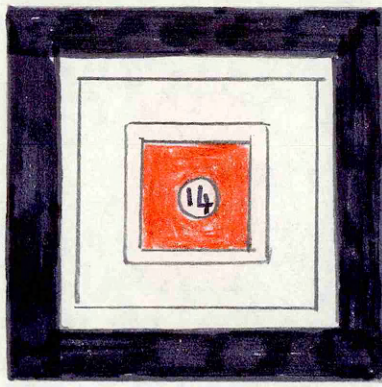
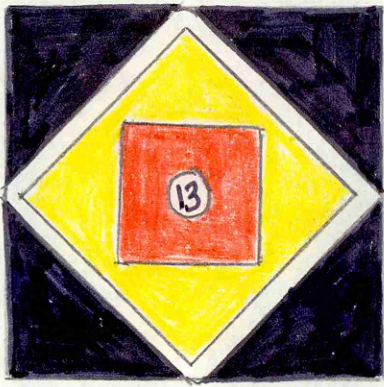
SORT (4): Double classification using edges of figures

	<u>Outer border</u>	<u>Inner border</u>	<u>Inner and Outer border</u>	<u>No border</u>
First Pair	23	4	11	19
	20	7	1	24
	22	21	8	3
Exemplars	13	6	14	17
	9	5	16	18
	15	10	2	12

APPENDIX IX

REPRESENTATION OF CARDS USED ON SORTING TASK OT 13





APPENDIX X

PICTURE ARRANGEMENT SUB-TEST

CRITERIA FOR CORRECT ARRANGEMENTS

<u>Item</u>	<u>Correct Order</u>	<u>Points</u>
1.	FIRE	2
2.	THUG	2
3.	QRST <u>or</u> SQRT	2
4.	EFGH <u>or</u> EFHG	2
5.	PERCY	2
6.	FISHER <u>or</u> FSIHER	2
7.	MASTER	2
7.	MSTEAR <u>or</u> ASTEMR	1

Maximum possible points for accuracy: 14

APPENDIX XI

Passage for Letter-Cancellation Task

No one would have believed the story of Arvid Anderson had it not been for his unshorn locks - a miracle unique in all Gulag. And that foreign bearing of his. And his fluent English, German and Swedish speech. According to him he was the son of a rich Swede - not merely a millionaire but a billionaire. (Well, let us assume he embellished a little). On his mother's side he was a nephew of the British General Robertson, who commanded the British Zone in occupied Germany. A Swedish subject, he had served as a volunteer in the British Army and had actually landed in Normandy, and after the war he had become a Swedish career officer. However, the investigation of social systems remained one of his principal interests. His thirst for socialism was stronger than his attachment to his father's capital. He looked upon Soviet socialism with feelings of profound sympathy, and he had even had the chance to become convinced of its flourishing state with his own eyes when he had come to Moscow as a member of a Swedish Military Delegation. They had been given banquets and taken to country homes and there they had encountered no obstacles at all to establishing contact with ordinary Soviet citizens - with pretty actresses who for some reason never had to rush off to work and who willingly spent time with them. And thus convinced once and for all of the triumph of our social system. Arvid on his return to the West wrote articles in the press defending and praising Soviet socialism. And this proved to be his undoing. In those very years they were roping in from all sorts of nooks and crannies progressive young Westerners prepared to renounce the West publically (and it appeared that if they could only have collected

another dozen or so the West would shudder and collapse). Arvid's newspaper articles caused him to be regarded as suitable for this category. At the time he was serving in West Berlin and he had left his wife in Sweden. Out of pardonable male weakness he used to visit an unmarried German girl in East Berlin. And it was there that he was bound and gagged one night (and is this not the significance of the proverb which says "He went to see his cousin and he ended up in prison"? This had probably been going on for a long time and he was not the first). They took him to Moscow, where Gromyko, who had once dined at his father's home in Stockholm and who knew the son also, not only returned the hospitality but proposed to the young man that he renounce publically both capitalism and his own father.

APPENDIX XII A

CHAPTER 6 STUDY 1

RAW SCORES, MEANS AND STANDARD DEVIATIONS ON COGNITIVE TASKS

FOR

HIGH OBSESSIONAL GIRLS

<u>Subject</u>	<u>OT13</u>	<u>Picture Arrangement</u>		<u>Spiral Maze</u>		<u>Letter Cancellation</u>
		<u>Accuracy</u>	<u>Time</u>	<u>Errors</u>	<u>Time</u>	
1	17	10	144	2	37	47
2	12	10	165	0	67	44
3	8	8	180	7	44	30
4	3	6	168	0	77	36
5	0	10	114	0	71	43
6	0	9	89	2	70	36
7	0	6	270	7	67	34
8	10	4	156	7	52	49
9	10	11	94	3	59	56
10	0	8	100	5	49	43
11	0	8	86	12	36	45
12	0	8	210	4	91	42
13	0	6	199	2	66	24
14	0	7	165	1	71	39
Mean :	4.286	7.929	152.9	3.714	61.21	40.57
S.D. :	5.876	1.979	53.19	3.518	15.82	8.178

N.B. All means and S.D.s originally calculated to 8 digits and corrected to 4 above.

APPENDIX XII B

CHAPTER 6 STUDY 1

RAW SCORES, MEANS AND STANDARD DEVIATIONS ON COGNITIVE TASKS

FOR

HIGH OBSESSIONAL BOYS

<u>Subject</u>	<u>OT13</u>	<u>Picture Arrangement</u>		<u>Spiral Maze</u>		<u>Letter Cancellation</u>
		<u>Accuracy</u>	<u>Time</u>	<u>Errors</u>	<u>Time</u>	
1	8	10	52	7	46	63
2	0	10	170	2	39	36
3	0	8	80	2	43	46
4	0	10	112	2	58	38
5	6	14	183	8	32	51
6	0	10	186	11	35	49
7	6	8	186	4	45	40
8	8	8	111	12	31	48
9	8	8	118	23	48	45
10	12	8	61	1	63	49
11	4	8	144	7	39	30
12	10	10	195	12	49	62
13	5	4	105	13	36	60
14	0	9	156	3	56	37
Mean :	4.786	8.929	132.8	7.643	44.29	46.71
S.D. :	4.191	2.165	48.41	6.134	9.825	10.07

N.B. All means and S.D.s originally calculated to 8 digits and corrected to 4 above.

APPENDIX XII C

CHAPTER 6 STUDY 1

RAW SCORES, MEANS AND STANDARD DEVIATIONS ON COGNITIVE TASKS

FOR

LOW OBSESSIONAL GIRLS

<u>Subject</u>	<u>OT13</u>	<u>Picture Arrangement</u>		<u>Spiral Maze</u>		<u>Letter Cancellation</u>
		<u>Accuracy</u>	<u>Time</u>	<u>Errors</u>	<u>Time</u>	
1	7	6	85	59	16	50
2	15	10	146	16	28	70
3	8	6	108	28	29	45
4	12	12	90	14	35	73
5	19	8	170	10	37	39
6	4	8	111	4	46	41
7	11	6	102	16	36	40
8	4	4	91	21	36	46
9	8	13	100	14	31	47
10	7	10	84	15	30	65
11	10	6	53	6	49	55
12	7	6	81	15	39	43
13	15	10	114	3	48	62
14	8	6	72	9	29	74
Mean :	9.643	7.929	100.5	16.43	34.93	53.57
S.D. :	4.343	2.674	29.63	13.93	8.905	12.77

N.B. All means and S.D.s originally calculated to 8 digits and corrected to 4 above.

APPENDIX XII D

CHAPTER 6 STUDY 1

RAW SCORES, MEANS AND STANDARD DEVIATIONS ON COGNITIVE TASKS

FOR

LOW OBSESSIONAL BOYS

<u>Subject</u>	<u>OT13</u>	<u>Picture Arrangement</u>		<u>Spiral Maze</u>		<u>Letter Cancellation</u>
		<u>Accuracy</u>	<u>Time</u>	<u>Errors</u>	<u>Time</u>	
1	0	12	54	1	70	45
2	19	10	68	6	38	47
3	23	14	113	3	44	54
4	12	10	264	1	50	40
5	0	6	62	8	41	54
6	10	8	69	9	35	30
7	8	8	216	21	29	46
8	23	10	161	32	34	43
9	11	6	63	16	37	59
10	11	9	75	4	37	33
11	23	8	89	29	31	38
12	15	6	73	21	31	43
13	4	6	89	11	39	43
14	12	8	64	21	34	41
Mean :	12.21	8.643	104.3	13.07	39.29	44.00
S.D.	7.817	2.405	64.33	10.31	10.43	7.942

N.B. All means and S.D.s originally calculated to 8 digits and corrected to 4 above.

APPENDIX XIII A

CHAPTER 6 STUDY 2

RAW SCORES, MEANS AND STANDARD DEVIATIONS

FOR

HIGH OBSESSIVE GIRLS

<u>Subject</u>	<u>Ai3Q</u>	<u>OT13</u>	<u>Picture Arrangement</u>		<u>Spiral Maze</u>		<u>Letter Cancellation</u>
			<u>Accuracy</u>	<u>Time</u>	<u>Errors</u>	<u>Time</u>	
1	21	12	10	83	4	47	77
2	20	4	12	179	5	50	76
3	20	0	14	125	2	61	73
4	20	8	6	151	0	69	65
5	20	0	14	273	2	72	31
6	22	0	10	90	1	58	49
7	19	0	12	243	1	63	82
8	20	0	10	179	2	60	68
9	19	0	14	146	0	50	56
10	22	4	10	236	3	78	76
11	22	0	12	123	1	42	82
12	23	0	13	262	0	51	89
13	19	0	10	237	9	30	68
14	23	4	10	279	11	43	60
15	19	0	10	165	0	90	55
Mean :	20.60	2.13	11.13	184.73	2.73	57.60	67.13
S.D. :	1.45	3.66	2.17	66.12	3.33	15.44	15.05

KEY : Ai3Q = Kline's measure of obsessiveness
OT13 = Sorting task

All figures originally calculated to 8 digits and corrected to 2 decimal places above.

APPENDIX XIII A

CHAPTER 6 STUDY 2

RAW SCORES, MEANS AND STANDARD DEVIATIONS

FOR

HIGH OBSESSIONAL GIRLS

<u>Subject</u>	<u>AH1</u>	<u>AH2</u>	<u>AH3</u>
1	26	55	81
2	54	62	116
3	49	60	109
4	10	29	39
5	25	38	63
6	13	24	37
7	26	44	70
8	20	33	53
9	24	43	67
10	13	23	36
11	44	62	106
12	50	62	112
13	37	49	86
14	13	32	45
15	19	32	51
Mean :	28.20	43.20	71.40
S.D. :	14.91	14.33	28.76

KEY : AH1 = AH4 Intelligence Test Part I
AH2 = AH4 Intelligence Test Part II
AH3 = AH4 Intelligence Test (Total)

All figures originally calculated to 8 digits and corrected to 2 decimal places above.

APPENDIX XIII B

CHAPTER 6 STUDY 2

RAW SCORES, MEANS AND STANDARD DEVIATIONS

FOR

HIGH OBSESSIONAL BOYS

<u>Subject</u>	<u>Ai3Q</u>	<u>OT13</u>	<u>Picture Arrangement</u>		<u>Spiral Maze</u>		<u>Letter Cancellation</u>
			<u>Accuracy</u>	<u>Time</u>	<u>Errors</u>	<u>Time</u>	
1	23	4	10	237	3	58	46
2	22	0	8	66	0	63	83
3	20	4	14	204	16	43	64
4	20	0	13	210	1	61	77
5	20	4	13	208	1	86	50
6	19	4	8	92	3	53	45
7	22	0	12	262	3	58	42
8	19	0	14	303	10	50	72
9	20	8	10	179	0	62	70
10	22	0	10	106	0	61	71
11	21	0	8	162	3	61	71
12	20	8	12	204	7	48	53
13	21	0	13	90	7	32	83
14	24	0	14	82	3	43	65
15	21	0	12	156	1	48	62
16	20	0	8	343	4	75	32
17	23	3	10	265	0	76	38
18	20	4	13	209	5	54	75
19	20	4	10	150	1	61	59
20	20	0	8	131	4	57	59
Mean :	20.85	2.15	11.00	182.95	3.60	57.50	60.85
S.D. :	1.39	2.72	2.25	76.27	3.98	12.36	14.96

APPENDIX XIII B

CHAPTER 6 STUDY 2

RAW SCORES, MEANS AND STANDARD DEVIATIONS

FOR

HIGH OBSESSIONAL BOYS

	<u>AH1</u>	<u>AH2</u>	<u>AH3</u>
<u>Subject</u>			
1	22	39	61
2	21	33	54
3	37	47	84
4	37	58	95
5	33	40	73
6	31	50	81
7	25	39	64
8	33	28	61
9	35	46	81
10	36	46	82
11	25	53	78
12	17	43	60
13	40	49	89
14	47	58	105
15	13	34	47
16	8	20	28
17	11	32	43
18	18	18	36
19	10	40	50
20	32	40	72
Mean :	26.55	40.65	67.20
S.D. :	11.18	11.00	20.32

APPENDIX XIII C

CHAPTER 6 STUDY 2

RAW SCORES, MEANS AND STANDARD DEVIATIONS

FOR

LOW OBSESSIONAL GIRLS

<u>Subject</u>	<u>Ai3Q</u>	<u>OT13</u>	<u>Picture Arrangement</u>		<u>Spiral Maze</u>		<u>Letter Cancellation</u>
			<u>Accuracy</u>	<u>Time</u>	<u>Errors</u>	<u>Time</u>	
1	11	8	8	151	10	34	73
2	13	16	11	85	15	31	80
3	13	28	10	143	30	33	41
4	13	0	12	171	11	54	55
5	14	8	10	119	6	38	72
6	9	4	12	50	13	38	79
7	12	16	8	85	15	34	81
8	13	11	6	83	45	17	45
9	14	8	8	77	4	41	69
10	12	11	6	172	26	28	64
11	14	4	8	105	4	49	82
12	14	8	12	164	8	45	42
13	13	4	10	115	16	45	60
14	14	12	8	105	12	44	50
15	7	3	6	96	17	40	55
16	10	4	8	216	6	41	84
17	13	7	12	65	5	57	88
Mean :	12.29	8.94	9.12	117.76	14.29	39.35	65.88
S.D.:	1.99	6.62	2.18	45.07	10.75	9.71	15.67

APPENDIX XIII C

CHAPTER 6 STUDY 2

RAW SCORES, MEANS AND STANDARD DEVIATIONS

FOR

LOW OBSESSIONAL GIRLS

<u>Subject</u>	<u>AH1</u>	<u>AH2</u>	<u>AH3</u>
1	39	50	89
2	42	49	91
3	22	40	62
4	44	58	102
5	17	34	51
6	36	45	81
7	33	51	84
8	12	21	33
9	21	38	59
10	30	40	70
11	42	49	91
12	34	51	85
13	31	48	79
14	13	22	35
15	34	43	77
16	42	48	90
17	29	47	76
Mean :	30.65	43.18	73.82
S.D. :	10.33	9.98	19.79

APPENDIX XIII D

CHAPTER 6 STUDY 2

RAW SCORES, MEANS AND STANDARD DEVIATIONS

FOR

LOW OBSESSIONAL BOYS

<u>Subject</u>	<u>Ai3Q</u>	<u>OT13</u>	<u>Picture Arrangement</u>		<u>Spiral Maze</u>		<u>Letter Cancellation</u>
			<u>Accuracy</u>	<u>Time</u>	<u>Errors</u>	<u>Time</u>	
1	13	4	10	85	18	29	63
2	11	4	8	101	12	43	41
3	11	0	12	224	2	51	59
4	12	0	8	71	22	33	58
5	10	28	8	71	7	44	58
6	14	20	8	107	6	43	70
7	14	0	9	85	5	40	46
8	11	20	10	86	22	34	79
9	11	12	11	132	3	52	33
10	13	4	8	117	6	30	62
11	8	8	8	65	15	41	77
12	13	8	10	110	11	33	75
13	13	16	12	68	12	40	71
14	11	12	6	89	17	35	69
15	7	16	8	82	1	49	45
16	7	4	8	109	60	38	50
17	12	4	6	87	9	39	51
18	12	8	10	73	2	51	63
Mean :	11.28	9.33	8.89	97.89	12.78	40.28	59.44
S.D. :	2.14	8.00	1.75	36.59	13.55	7.22	13.05

APPENDIX XIII D

CHAPTER 6 STUDY 2

RAW SCORES, MEANS AND STANDARD DEVIATIONS

FOR

LOW OBSESSIONAL BOYS

<u>Subject</u>	<u>AH1</u>	<u>AH2</u>	<u>AH3</u>
1	41	58	99
2	27	36	63
3	35	43	78
4	39	52	91
5	18	19	37
6	22	54	76
7	29	42	71
8	39	45	84
9	18	30	48
10	27	39	66
11	29	56	85
12	46	64	110
13	29	59	88
14	37	43	80
15	13	35	48
16	21	42	63
17	29	30	59
18	38	44	82
Mean :	29.83	43.94	73.78
S.D. :	9.14	11.70	18.80