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IDENTIFICATION OF SUBTYPES OF LEARNING-DISABLED CHILDREN WITH ARITHMETIC DISORDERS: A NEUROPSYCHOLOGICAL, MULTIVARIATE ANALYSIS.

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IDENTIFICATION OF SUBTYPES OF LEARNING DISABLED CHILDREN: A MULTIVARIATE ANALYSIS OF PATTERNS OF PERSONALITY FUNCTIONING

by

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ABSTRACT

The purpose of this investigation was to determine if there is any evidence to support the notion that learning-disabled children constitute a heterogeneous population with regard to their personality functioning. Factor analytic techniques, applied to various measures of personality functioning, were employed to identify subtypes of learning-disabled children.

The subject sample was comprised of 100 children (87 males, 13 females) between 6 and 16 years of age. Each subject was primarily English speaking and had demonstrated roughly average intelligence, marked deficiency in at least one academic skill, and adequate sensory acuity. All subjects had survived a screening procedure designed to rule out primary emotional disturbance, socio-cultural deprivation and instructional deprivation.

The Personality Inventory for Children (PIC) had been completed on each subject by his/her mother. The PIC is a 600 item true-false questionnaire on which the mother reported her perception of her child's social, emotional and behavioural functioning. The inventories were scored for 33 scales, and the scales were intercorrelated and factored. Seven (7) factors, accounting for 76.2% of the common variance, were identified. In this and all other factor analytic procedures, an

iterated principal axis solution and orthogonal rotation to a varimax criterion were employed.

For further analysis, 15 of the 33 scales were selected in a manner designed both to ensure adequate representation of the 7 PIC factors, and to minimize the untoward effects of inter-scale item overlap. Based on these 15 scales, intercorrelations between subjects were determined and factored to an eigenvalue criterion. Four factors, accounting for 69.5% of the common variance, were identified. Each subject with a factor loading $\geq |.50|$, and with an interval $\geq .10$ between the highest and next highest loadings, was retained and assigned to the factor of his/her highest loading. In this manner, 77% of the subjects were assigned to the four factors or subtypes. Results of MANOVA and Spearman rank correlation procedures indicated that each of the four subtypes demonstrates a distinct personality pattern. The high degree of agreement between two further Q-type factor analyses (conducted on different sets of PIC scales) demonstrated the psychometric reliability of the procedures.

There appear to be four subtypes of learning-disabled children that differ from eachother in terms of personality functioning. The largest subtype tends to demonstrate quite adequate social-emotional functioning. The other three subtypes seem to be characterized, respectively, by: (a) marked psychological disturbance

reflected by internalized social-emotional difficulties; (b) externalized behavioural disturbance reflected by overactivity, distractibility, interpersonal insensitivity, and antisocial behaviour; and (c) a disproportionate pervasiveness and/or intensity of somatic concerns, accompanied by otherwise adequate personality functioning. The implications of this investigation with regard to previous studies and future research needs was discussed.

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CHAPTER I

INTRODUCTION

Many children have great difficulty acquiring basic academic skills. The learning problems of some can be attributed to limited intelligence, sensory deficits, motor impairments, emotional disturbance, inadequate instruction, or socio-economic and cultural deprivation. Other children who underachieve significantly, however, do not appear to suffer from any of these conditions. Although a wide variety of terms have been introduced to describe such children, they are most frequently referred to as "learning-disabled."

Over the past thirty years, dramatic growth is evident in the theoretical and research literature concerned with learning disabilities. Most authors believe that learning-disabled children are particularly prone to social-emotional difficulties (Connolly, 1971). "Almost all children with reading disabilities suffer from some kind of personality difficulty" (Natchez, 1968, p.26). "Few cases of learning disorders are without emotional difficulties" (Bryant, 1966, p.271). Unfortunately, this hypothesized relationship between social-emotional problems and learning disabilities has been

assessed in relatively few well-controlled studies. Furthermore, the available evidence tends to be unclear, inconsistent, and even trivial. It is hoped that the present study will serve to alleviate some of this confusion.

In this chapter, research relevant to the social-emotional functioning of learning-disabled children will be presented. This will be followed by a discussion of four methodological and conceptual problems which arise from the literature. The most important problem, in the present context, relates to the research strategies employed Recent neuropsychological research provides compelling evidence in support of the notion that learning-disabled children are heterogeneous in terms of the patterning of their abilities. If they are also heterogeneous in terms of their social-emotional functioning, the research strategies employed in virtually every study investigating this aspect of learning disabilities are inappropriate.

The purpose of the present study was to ascertain if there is evidence to support the hypothesis that learning-disabled children are heterogeneous with regard to their social-emotional functioning. More specifically, the aim was to identify subtypes of learning-disabled children via a multivariate analysis of a sample of such children on whom various measures of emotional, interpersonal, and behavioural functioning have been obtained.

The relevance of identifying such subtypes stems from the importance of meeting the social and affective needs of learning-disabled children. If they manifest several distinct patterns of social-emotional functioning, these patterns must be identified before effective approaches to attenuating their difficulties can be developed. To date, the possibility of heterogeneity of social-emotional functioning remains largely unaddressed in the learning disabilities literature. The present study is intended as an exploratory step in investigating this question.

Before proceeding with a review of the literature, a brief explanation will be offered with regard to the manner in which the studies will be presented. Some of the studies (sociometric peer studies, and research concerning the parents and families of learning-disabled children) are clearly intended to provide evidence of the interpersonal environments, rather than intrinsic characteristics, of learning-disabled children. Others (which rely on teachers', parents' and observers' reports) involve comparisons of data gathered on learning-disabled and normally-achieving children from or by people who were almost always aware of the group membership of the children on whom they were reporting. It is well documented that one's expectations and the labeling process have a profound effect upon one's perception (Rosenham, 1973; Rosenthal & Jacobsen, 1968). Therefore, McDermott (1977) and others

have cautioned against interpreting such research as providing evidence regarding intrinsic characteristics of learning-disabled children. "It would seem much closer to the data and more sound from an inferential point of view to interpret the foregoing literature as representing the perception by others of learning- and reading-problem children" (pp. 8-9). For this reason, studies which rely on the perceptions of others will be considered as providing direct evidence only of the interpersonal environments confronted by learning-disabled children. Finally, several studies are available in which data gathered "blindly" from learning-disabled and normally-achieving children was compared. Only the findings of these studies will be considered as direct evidence of the social-emotional characteristics of learning-disabled children.

Social-Emotional Characteristics of Learning-Disabled Children

General Maladjustment

The general social and emotional adjustment of learning-disabled children has been examined via the use of various psychological tests. Zimmerman and Allebrand (1965) administered both psychometric (the California Test of Personality) and projective (card I of the Thematic Apperception Test) instruments to otherwise comparable

groups of learning-disabled and normally-achieving pre-adolescents. On the psychometric test, between group differences were significant on all six of the "personal adjustment" scales (Self-Reliance, Sense of Self-Worth, Sense of Personal Freedom, Feelings of Belonging, Withdrawal Tendencies, and Nervous Symptoms) and on one of the six scales designed to measure "social adjustment" (Community Relations). In each case, the learning-disabled children achieved scores indicative of poorer adjustment. Furthermore, from the stories told on the projective test, the normal achievers were judged to be personally optimistic and " . . . motivated by internalized drives which result in effortful and persistent striving for success" (p.30); whereas the learning-disabled children were seen as tending to expect failure and to adopt ephemeral or immediate goals because they did not relate current effort to future reward.

A study by McNutt (1978) suggest that these differences in adjustment continue into adolescence. She administered the California Psychological Inventory to otherwise comparable groups of learning-disable and unimpaired adolescents. The learning-disabled group was found to be more poorly adjusted both socially and emotionally, as evidenced by significantly lower scores on the Sociability, Social Presence, Self-Acceptance, and Sense of Well-Being Scales.

Contradictory evidence, however, emerged from a study by Connolly (1969) in which the Rorschach Psychodiagnostic, Rosenzweig Picture-Frustration Study, and Human Figure Drawing Test were used to assess personality functioning. He found no difference in personality organization, degree of emotional disturbance, or impulsivity as a global trait, between matched groups of learning-disabled (labeled mildly dyslexic) and normally-achieving youngsters. The only notable between group difference was that the learning-disabled children were judged more likely to act impulsively in affect-laden situations, especially when under considerable tension or pressure.

Self-Concept

The notion that learning-disabled children tend to have low self-esteem, or a poor self-concept, was examined in studies by Halechko (1977), Black (1974), Silverman (1978), and Ribner (1978). Halechko administered a modified version of Coopersmith's Self-Esteem Inventory to comparable groups of learning-disabled and normally-achieving children. She found the learning-disabled group to demonstrate markedly and significantly lower self-esteem than the normal achievers. In a similar study using the Piers-Harris Self-Concept Scale, Black (1974) confirmed Halechko's results, and also found that the between-group difference increased with age. Using the

same scale, however, Silverman (1978) did not find learning-disabled and unimpaired adolescents to differ in self-concept.

Ribner (1978) investigated the self-concept notion in a somewhat more complex study. He devised a brief questionnaire to measure, in part, what he termed "self-perceived general competency," and administered the questionnaire to three groups of children: normal achievers in regular classes; learning-disabled children in special classes; and children in regular classes who were subsequently identified as learning-disabled. Ribner found that the normal achievers demonstrated significantly higher scores on this measure of self-concept than did the as yet unidentified learning-disabled children, but that the learning-disabled children in special classes achieved intermediate scores which did not differ significantly from those of either regular class group. In other words, Ribner's results indicate that normal achievers demonstrate greater self-esteem than regular-class learning-disabled children whose difficulties have not been identified, but that identified learning-disabled children in special classes cannot be differentiated from normal achievers on the basis of self-esteem. Ribner's work indicates the need for extreme caution in generalizing results beyond the specific population studied,

caution not always adopted by learning disabilities researchers.

The majority of studies do suggest that learning-disabled children are particularly prone to general maladjustment and low self-esteem. However, results are sufficiently discrepant to prevent one from reaching definitive conclusions. The studies reviewed differ in instrumentation, experimental rigour and, possibly, group composition. The discrepancies among findings could well stem, to a large extent, from these differences.

Perception of Nonverbal Communication

Some authors have suggested that the frequently reported poor interpersonal functioning of learning-disabled children might stem, at least in part, from a lesser ability to accurately comprehend nonverbal communication. In an attempt to investigate this notion, Bryan (1977) had otherwise comparable groups of learning-disabled and normally-achieving children either view a film (half of each group) or listen to an audiotape. Both the film and audiotape consisted of presentations of 40 different scenarios in each of which a woman expressed various emotions nonverbally (verbal messages had been made uninterpretable by mechanical means). Following the presentation of each scenario, the children were asked to indicate which of two statements best described the

emotions being expressed. Results indicate that the learning-disabled children, in contrast to the normal achievers, were significantly less accurate in comprehending nonverbal communication of both a visual and vocal nature. In a similar study with adolescents (Wiig & Harris, 1974), the relative inability of learning-disabled children to accurately identify nonverbal affective expressions was confirmed.

The Interpersonal School Environment

Teachers' Perceptions

Research has consistently demonstrated that teachers tend to perceive learning-disabled children as less desirable in the classroom than normal achievers. In similar studies employing the Pupil Behavior Rating Scale (PBRS), Myklebust, Boshes, Olson, and Cole (1969: cited in Bryan & Bryan, 1978) and Bryan and McGrady (1972) found that teachers perceive learning-disabled children, in comparison to normal achievers, as significantly less cooperative, attentive, tactful, socially accepted, and able to organize themselves, cope with new situations, accept responsibility, and complete assignments. In fact, in the Bryan and McGrady (1972) study, the learning-disabled children were rated significantly lower on 23 of the 24 PBRS items!

McCarthy and Paraskevopoulos (1969) found that teachers reported significantly more behaviour problems among learning-disabled children than among normal achievers on all three dimensions of the Behavior Problem Checklist ("Unsocialized Aggression," "Immaturity-Inadequacy," and "Personality Problem"). Teachers were found to view the behaviour problems of learning-disabled children as most pronounced on the "Unsocialized Aggression" dimension. This latter finding is consistent with that obtained in a study by Keogh, Tchir, and Windeguth-Behn (1974). They asked teachers to provide descriptive labels for learning-disabled and mentally retarded children. Consistently, the mentally retarded children were described as having academic difficulties but presenting few behavioural problems. In contrast, the learning-disabled children were described as manifesting primarily conduct and personality problems, and terms such as "violent," "cruel," "destructive," "hyperactive," "irresponsible," and "undisciplined" were frequently used.

Overall, it is clear that teachers tend to perceive learning-disabled children more negatively than they do normal achievers or mentally retarded children. Furthermore, this difference in perceptions is maintained regardless of the behavioural characteristic or dimension in question. One can only wonder whether learning-disabled children do indeed manifest disturbance in so

many classroom behaviours, or whether a most powerful "halo effect" is implicated in these research findings.

Sociometric Peer Research

In order to ascertain how learning-disabled children are perceived by their peers, Bryan (1974b, 1976) employed the "Guess Who" technique. This technique involves asking children to identify which of their classmates is always worried or scared, finds it hard to sit still, is handsome (or pretty), etc. Bryan found learning-disabled children to be disproportionately represented among children identified as "worried and frightened," "sad," "not neat and clean," "not very good looking," and "someone to whom nobody pays attention." A second aspect of Bryan's studies involved the use of sociometric techniques to assess the peer popularity of learning-disabled children. Popularity was defined as the number of times a child was selected by peers as one of three classmates desirable as a friend, classroom neighbour, or invitee to a birthday party. Rejection was similarly measured from responses to a request to select three classmates undesirable for these functions. Learning-disabled children were found to be significantly less popular and more rejected than comparison children.

A sociometric study by Siperstein, Bopp, and Bak (1978) supports the notion that learning-disabled children

tend not to be among the most popular children. However, it casts some doubt on Bryan's finding regarding peer rejection. Siperstein and his colleagues failed to find learning-disabled children to be overly represented among those not selected by any of their classmates (or selected by only one whom the child had not selected in return) as desirable as a friend. Although this is referred to as a measure of social isolation, it could also be interpreted as evidence that learning-disabled children are not disproportionately rejected by their peers.

Observational Research

The actual classroom behaviours and interpersonal transactions of learning-disabled children have been compared to those of normal achievers in a few direct observational studies. Unfortunately, in only one (Bryan & Wheeler, 1972) is it clear that the observers were unaware of the group membership of the children on whom they were reporting. Richey and McKinney (1978) used the Schedule for Classroom Activity Norms (SCAN) with comparison pairs of learning-disabled and normally-achieving children. They found no significant difference between the two groups with regard to self-directed activity, attending behaviour, passive responding, gross-motor activity, or social interaction. Only on the SCAN variable of distractibility did the learning-disabled

children fare more poorly. Although the authors did not define distractibility, this finding appears to be consistent with that of other observational studies (Forness & Esteveldt, 1971; Weiss, Minde, Werry, Douglas & Nemeth, 1971).

In studies by Bryan and Wheeler (1972) and Bryan (1974a), learning-disabled children were found to spend more time engaged in nontask-oriented behaviour (non-productive behaviour and/or activities not prescribed) and less time engaged in task-oriented behaviour (purposeful activity prescribed by someone else) than their normally achieving peers. Although the two groups did not differ in the proportion of time spent interacting socially, the quality of interpersonal interactions with both teachers and peers differed significantly. More specifically, compared to the normal achievers, the learning-disabled children were the recipients of less teacher- and peer-initiated interactions, were more frequently ignored when they themselves initiated verbal contact, were related to by teachers in a more functional (less relationship-oriented) manner, and were the recipients of more negative communications from teachers. These latter studies appear to be inconsistent with the findings of Richey and McKinney (1978). Differences in instrumentation and, perhaps, group composition might have contributed to the discrepant results.

In a study of children's communications, Bryan, Wheeler, Felcan, and Henek (1976) found that, in comparison to normal achievers, learning-disabled children tend to express more competitive statements towards peers, and to be the recipients of fewer statements of consideration from them. However, significant between-group differences did not emerge with regard to the frequency of expressed or received statements indicative of peer rejection, poor self-image, cooperation, verbal assistance, or intrusiveness.

In summary, despite contradictory evidence regarding specifics, it is clear that the interpersonal school environment of learning-disabled children is particularly hostile. They tend to be perceived by teachers, peers and independent observers in less desirable terms than normal achievers wherever between-group differences emerge. Furthermore, both teachers and peers tend to behave in ways fully consistent with these negative perceptions. In this regard, McDermott (1977) has emphasized the need to " . . . consider the possible influence of self-fulfilling prophecy and acquiescence to role attribution in the difficulties experienced and manifested by these children" (pp. 14-15).

The Interpersonal Home Environment

Parents' Perceptions

The detrimental effects of the negative views of learning-disabled children held by teachers and peers would likely be ameliorated, to some degree, should the views held by parents be markedly different. However, all three available "parent perception" studies indicate that this is not the case. In each study, parents described the behavioural and/or emotional tendencies of their children, and the descriptions given by parents of learning-disabled children were compared to those given by parents of normal achievers. Using the Interpersonal Check List, Seigler and Gynther (1960) found that, in comparison to the description of normally-achieving youngsters, learning-disabled boys were described as more aggressive, distrustful, and dependent, and as having less healthy and well-adjusted personalities. Strag (1972) found that learning-disabled and normally-achieving children could be differentiated according to their parents' responses on a 30 item behaviour rating scale. The learning-disabled children were rated as significantly less considerate of others, able to receive affection, and physically coordinated, and more clinging, negativistic, rigid, and easily fatigued. Owen, Adams, Forrest, Stolz, and Fisher (1971) conducted personal

interviews with the parents of learning-disabled and normally-achieving children. They found the learning-disabled youngsters more frequently described as impulsive, anxious, verbally inept (both expressively and receptively), unable to structure their environment, and unable to persevere in schoolwork.

It is interesting to note that no between-group differences were found on items relating to distractibility, hyperactivity or emotional lability (characteristics commonly ascribed to learning-disabled children) in any of the parent perception studies. Overall, however, it is clear that parents hold no less pejorative views of their learning-disabled children than do teachers and peers.

Parental Characteristics

Coleman, Bornston, and Fox (1958) pioneered controlled research into the characteristics of parents of learning-disabled children. They collected demographic data on, and administered the University of Southern California Parent Attitude Survey to, the parents of learning-disabled and normally-achieving boys of comparable age and intelligence. Both parents of learning-disabled boys tended to have lower educational levels than those of normal achievers. More importantly, relative to their spouses, mothers in the former group were better educated. Fathers' attitudes did not differ between groups, but

mothers of learning-disabled boys expressed significantly more domineering attitudes than did mothers of normal achievers.

The typical mother of a learning-disabled child, in contrast to that of a normal achiever, appears to exhibit marked variability (approaching bimodality) on a solicitousness-rejection dimension. In a previously described interview study by Owen et al. (1971), mothers of learning-disabled children were found more likely than control mothers to withhold affectional warmth. Wetter (1972), using the Mother-Child Relationship Evaluation, found mothers of learning-disabled children to be both more rejecting and more overindulgent than mothers of controls. Finally, Goldman and Barclay (1974), in an uncontrolled study described below, found mothers of learning-disabled children to sometimes over-, and sometimes under-reward their children.

Goldman and Barclay (1974) found that the responses of mothers of learning-disabled children were significantly different than the norm on 6 of the 23 scales of the Parent Attitude Research Instrument. These mothers tended to minimize mother-child communication, suppress sexuality, be autocratic with a strong need for control, express much unhappiness and marital discord, and be relatively dissatisfied with their roles in life. Goldman and Barclay concluded that these mothers, out

of a need to control and direct their children's activity, infantilize them and foster a dependent, autocratic, directing relationship.

The question arises as to whether the actual behaviour of mothers of learning-disabled children is concordant with their above discussed self-descriptions. Direct observational studies by Bercovici and Feshbach, and Feshbach and Bercovici (cited in Feshbach, 1973) indicate that this is the case. The authors, employing both mothers of learning-disabled children and mothers of otherwise comparable normal achievers, instructed each mother to teach certain visual-motor tasks to three children (one at a time)--her own child, another child in the learning-disabled group, and another child in the normally-achieving group. Between group differences were striking. Regardless of the child being taught, the mothers of learning-disabled children tended to be more punitive, more controlling and directing, more intrusive when the child encountered difficulty and, in general, more negative in their verbalizations. In addition, the authors had each mother complete the Child Rearing Practices Report. Responses on this self-report instrument corresponded closely with the behavioural styles that had been observed.

In summary, the literature paints a picture of the mother a learning-disabled child as domineering, auto-

cratic, controlling, punitive, demanding, rejecting, infatilizing, and overindulgent yet distant and unaffectionate.

The characteristics of fathers of learning-disabled children, though less thoroughly investigated than those of mothers, have been examined by Miller and Westman (1964 and 1966) and Grunebaum, Hurwitz, Prentice, and Sperry (1962). Miller and Westman gathered data on fathers of learning-disabled and normally-achieving boys through a variety of means, including questionnaires, interviews, projective tests, family therapy sessions, and periodic home visits. In comparison to the control fathers, the fathers of learning-disabled boys were seen as passive, dependent, fearful men who presented dominating, powerful, threatening and punitive facades. They tended to be self-depreciatory regarding their own achievements, and even those who were notably successful tended to ascribe their accomplishments to good fortune. These men expressed little self-confidence, and presented themselves as helpless and incompetent. Their interests were solitary in nature, they tended to withdraw from contact with other family members, and they attempted to minimize contact between their families and the outside world. Strikingly, these fathers frequently perceived their learning-disabled sons as similar to themselves. They tended to derogate, humiliate and dominate their

sons, to negate information regarding positive aspects of their sons and, despite protestations to the contrary, to be unable to truly enjoy their sons' accomplishments. Grunebaum et al. (1962) collected data only through regularly scheduled, unstructured interviews with the fathers of learning-disabled boys. Although extreme caution must be exercised in reaching conclusions from such an uncontrolled study, it is most noteworthy that the characteristics of fathers of learning-disabled boys identified by Grunebaum and his colleagues differ little from those subsequently described by Miller and Westman.

Family Patterns

The introduction of family "systems" concepts (eg. Watzlawick, Bevin, & Jackson, 1967) has enabled increasingly sophisticated examination of the intra-familial environment of learning-disabled children.[1] Miller, Westman and Arthur (Miller & Westman, 1964, 1966; Westman, Miller, & Arthur, 1966) investigated the notion that the learning-disabled child serves as a "family scapegoat." In other words, that his/her academic difficulties tend to diffuse tensions produced by unresolved conflicts in the spousal relationship, thereby

[1] The interested reader is referred to McDermott (1977) for a broader perspective regarding the relevance of family systems theory to learning disabilities.

performing an important role in maintaining the disturbed family homeostasis.[2] The investigators collected considerable data on learning-disabled boys and their families (via extensive psychological testing, interviews, home and school visits, and weekly family therapy sessions). Unfortunately, no control group was used. Miller and his colleagues found patterns which are fully consistent with the scapegoat hypothesis. They found that the learning-disabled boys demonstrated the typical "scapegoat" behavioural tendencies, and that their parents appeared to be displacing their marital conflicts onto the boys. These conflicts tended to relate to the fathers' passivity and inadequacy in contrast to the mothers' aggressiveness and dominance. In additon, the parents tended to activate negative feedback mechanisms (eg. overt reinforcement of poor study habits) whenever the boys' reading ability began to improve. If the child continued to progress academically despite this pressure, an emotional crisis was often precipitated in another family member.

The notion that disturbed patterns of family interaction characterize the families of learning-disabled

[2] The scapegoat model has been found most useful in understanding a variety of children's problems, and considerable evidence is available regarding both the behavioural propensities of scapegoated children and the manner in which family members react to attempts by these children to "throw off" the scapegoat role (eg. Bell & Vogel, 1960).

children has been investigated in several studies which focussed on communication patterns. Peck and Stackhouse (1973) analysed audiotapes of families of learning-disabled children and families of normally-achieving children engaging in a joint decision making task. Families in the former group were found to require more time to make decisions, to be silent more of the time, to exchange less relevant information, and to spend more time in task-irrelevant communication. The authors concluded that the " . . . combination of low explicit information, high irrelevancies, and extended decision time . . . seems an operational definition of the family concept, pseudomutuality" (p.509), a communicational or relationship style thought to be characteristic of disturbed families (Wynne, Ryckoff, Day, & Hirsch, 1960).

Further evidence in support of the notion that disturbed family communication and learning disabilities are related is forthcoming from two other studies. Campbell (1972) found that the parents of learning-disabled children distorted significantly more elements when relating information to their children than did parents of normal achievers, but no between-group differences were apparent when the parents related the same information to the experimenter. Sundstrom (1968) found that instructing parents in effective communication tended to increase the academic gains evidenced by their learning-

disabled children enrolled in remedial classes. It appears that the families of learning-disabled children do indeed resemble families of emotionally disturbed children in several important ways.

If the families of learning-disabled children tend to be disturbed, how is it that other siblings so often escape the effects of this disturbance? Owen et al. (1971) found that parents tend to perceive their learning-disabled child, in contrast to their other children, as more anxious and impulsive, less able to structure the environment, and having poorer verbal skills. McDermott (1977) demonstrated that these differing perceptions tend to accompany differential behaviour towards the children. He had both parents instruct (at different times) their learning-disabled son and their normally-achieving son on a non-reading, visual-motor task. In contrast to their interactions with their normally-achieving sons, mothers were less generally positive and fathers were more directing, intrusive, overtly negative, rejecting, and derogating with their learning-disabled sons. McDermott's findings are consistent with observations made in previously reviewed studies on paternal characteristics. However, his finding that the mothers " . . . appeared to take responsibility for the encouraging, the soothing, and the provision of positive feedback" (pp. v-vi) stands in stark contrast to the characteristics others have

attributed to mothers of learning-disabled children. Again, contradictions in the research prevent the forming of firm conclusions.

Summary

Research into the social, emotional and behavioural functioning, and interpersonal environments, of children with learning disabilities is characterized by confusion: the results of many studies could best be described as trivial; many findings fail to find support in replication attempts; some studies directly contradict each-other; and it remains unclear how, or even whether, those factors which have been identified and replicated are related to one another.

Despite the discrepancies with regard to specifics, however, the bulk of the research suggests that learning-disabled children must deal with an interpersonal environment that differs markedly from that confronting their normally-achieving peers. In contrast to normal achievers, learning-disabled children apparently tend to: (a) be perceived as less pleasant and desirable by teachers, peers and parents; (b) be the recipients of more negative communications from teachers, peers and parents; (c) be ignored and rejected more often by teachers; (d) be treated in a notably more punitive and derogating manner by their parents; and (e) live in families which resemble, in certain important ways, those of emotionally disturbed children.

One would certainly expect, therefore, to find that learning-disabled children have a particularly difficult time emotionally and socially. However, the evidence regarding the emotional, interpersonal, and behavioural characteristics of children with learning disabilities is equivocal at best. A coherent and meaningful pattern of intrinsic characteristics of learning-disabled children does not emerge from the research reviewed. Possible reasons for this will be examined in the following section, via a discussion of four methodological and conceptual problems which are apparent in the research.

Methodological and Conceptual Issues

Definition of the Population

> The sine qua non for systematic investigation would seem to be a good operational definition for the phenomenon under study, one which is unambiguous, in some sense meaningful, and capable of being used by independent investigators. There has been no such consistent formulation in studies of reading retardation . . . . (Applebee, 1971, p.91)

Most investigators would agree that a learning-disabled child is one who demonstrates marked academic underachievement which cannot be traced to intellectual limitations, sensory deficits, motor impairments, socio-economic disadvantage, inadequate instruction, or emotional disturbance. The actual identification of such children, however, is another matter. In many studies the criteria used to identify learning-disabled subjects are vague or

undefined. Some investigators (eg. Peck & Stackhouse, 1973) relied on assessments made by school personnel whose criteria remained unreported, whereas others (eg. Forness & Esteveldt, 1971) selected subjects solely on the basis of teachers' perceptions without any further assessment whatsoever. Even among those studies in which subject selection criteria are clearly specified, however, there is little consistency in the criteria employed. The effects of differences in selection criteria is dramatically illustrated in a recent study by McNutt (1978). She applied five commonly employed sets of identification criteria to a large sample of school children, and found that use of the most inclusive set resulted in the identification of over nine times as many children as learning-disabled as did application of the most restrictive one! It is not unlikely that some inconsistent or contradictory research results reflect this variation in group composition. Clearly, a universally adopted set of specific identification criteria is needed. Until this is accomplished, it behooves researchers to employ and clearly elucidate specific subject selection criteria in order to convey the nature of the population to which their research results apply.

Measurement of Maladjustment

Constructs such as "emotional disturbance," "socio-emotional adjustment," "personality characteristics,"

and "disturbed patterns of family functioning" have been, perhaps, even less adequately operationalized. Connolly (1971) emphasized that maladjustment is a subjective phenomenon which varies in connotation from person to person and situation to situation. He pointed out that the methods traditionally thought to be best for assessing maladjustment are often subjective in nature. The difficulty in replicating research which depends upon subjective judgement is readily apparent. Thus, the failure to replicate some research findings might be due, in part, to the nature of the instruments used to measure maladjustment or disturbance. Studies which employ easily quantified psychometric instruments would avoid this problem.

Developmental Considerations

Several studies offer support for the notion that the nature of the ability deficits exhibited by learning-disabled children varies with age (Leong, 1976; Rourke, Dietrich & Young, 1973; Rourke & Orr, 1977). If their social-emotional functioning also varies with age (a not unreasonable possibility), differences in research results could reflect differences in the agesoof the subjects employed. Therefore, it behooves the learning disabilities investigator to allow for this possibility. This can be done either by restricting the age-range of subjects employed, or by designing the study so as to enable an evaluation of developmental parameters.

Heterogeneity

The fourth and most important methodological issue to be discussed emerges from a consideration of conceptual or statistical models. Applebee (1971), in his outline of possible statistical models of learning disabilities, emphasized the degree to which the models differ from eachother in terms of both underlying assumptions about the nature of learning disabilities, and implications regarding appropriate research methodologies. Virtually all of the studies which have attempted to identify social-emotional correlates of learning disabilities have employed the same basic research design. Undifferentiated groups of learning-disabled children have been compared to equally undifferentiated groups of normal achievers. In other words, learning-disabled children have been treated as a unitary group. Among the most serious drawbacks to such an approach is that it tends to obscure within-group differences. As Applebee (1971) pointed out, employment of this "comparative populations" approach can only be justified if one can safely assume that learning-disabled children are homogeneous in terms of their social-emotional functioning.

However, recent neuropsychological research indicates that, at least in terms of the patterning of their abilities, learning-disabled children constitute a heterogeneous population (Benton, 1975; Fisk, 1978; Rourke, 1978).

Meaningful subtypes of learning-disabled children have been identified (Doehring & Hoshko, 1977; Fisk, 1978; Mattis et al., 1975; Nelson & Warrington, 1976; Petrauskas & Rourke, 1979; Rourke & Strang, 1978; Sweeney & Rourke, 1978;). Could it be that learning-disabled children are also heterogeneous with regard to their social-emotional functioning? Unfortunately, this possibility has not been investigated. If the assumption of homogeneity is incorrect, inappropriate research designs could account for the rather meagre findings with regard to the social-emotional characteristics of learning-disabled children.

Multivariate statistical procedures, particularly Q-type factor analytic techniques, have been used successfully in attempts to identify subtypes of learning-disabled children differing in terms of ability patterns (Doehring & Hoshko, 1977; Fisk, 1978; Petrauskas & Rourke, 1979). These procedures would appear to offer a viable method of assessing the hypothesis that learning-disabled children constitute a heterogeneous population with regard to personality (i.e. emotional and social-behavioural) functioning.

The present study is intended to test this hypothesis. Specifically, an attempt will be made to identify subtypes of learning-disabled children by applying Q-factor analysis to a sample of such children on whom various measures of emotional, interpersonal and behavioural functioning

have been obtained. Subjects will be selected and described so as to give full consideration to the other methodological issues discussed above.

Expectations

It is expected that reliable subtypes of learning-disabled children will emerge. Because of the exploratory nature of this study, it is most difficult to predict either the number or the characteristics of the subtypes expected to emerge. On the basis of repeated observations in the literature, however, it would seem reasonable to expect the identification of at least one subtype characterized by quite adequate personality functioning.

CHAPTER II

METHOD

Subjects

The 100 subjects employed in this investigation were selected from the population of children referred to Windsor Western Hospital Centre for neuropsychological assessments because of apparent learning or "perceptual" problems. The subjects, 87 males and 13 females, were between 6.5 and 15.3 years of age. All of them had obtained Full Scale IQs between 85 and 115 (inclusive) on the Wechsler Intelligence Scale for Children (WISC; Wechsler, 1949). Each subject had obtained a centile score no higher than 25 on at least one subtest (Reading, Spelling, or Arithmetic) of the Wide Range Achievement Test (WRAT; Jastak and Jastak, 1965). Table 1 contains summary statistics on the subject sample regarding age, WISC IQ (Verbal, Performance and Full Scale), and WRAT centile score (Reading, Spelling and Arithmetic).

Defective hearing and vision had been ruled out for all subjects. A Sweep Hearing Test over a wide range of frequencies is administered as part of the routine neuropsychological assessment. No children who had exhibited a hearing loss of 30 decibels or more with either ear at

Table 1

Subject Summary Statistics Regarding Age, IQ and Academic Achievement

	Mean	Standard Deviation	Range
Age	10.5	2.2	6.5 to 15.3
WISC Verbal IQ	95.0	8.3	76 to 123
Performance IQ	102.7	10.6	80 to 131
Full Scale IQ	98.5	8.0	85 to 115
WRAT Reading Centile	23.4	19.1	3 to 88
Spelling Centile	14.8	11.2	1 to 55
Arith. Centile	19.2	13.2	2 to 75

any frequency in the speech range were selected as subjects. Children were judged to be free of defective vision if their parents and the psychometrist who had administered the neuropsychological test battery both reported that the children appeared to have normal vision (either with or without corrective lenses).

Children suspected of suffering from socio-economic and cultural deprivation were also not selected: suspicion of such deprivation arose when indicated in a report from a Children's Aid Society or from the referring party. Primary emotional disturbance had also been ruled out: children in treatment for emotional disturbance at the hospital or elsewhere, or diagnosed as needing such treatment by a psychologist or psychiatrist, had been excluded from the subject sample.

All subjects spoke English as their primary language and had attended school since at least 6 years of age.

Test Measures

The Personality Inventory for Children (PIC: Wirt, Seat & Broen, 1977) was designed to assess a child's social, emotional and behavioural functioning. It is composed of 600 true-false questions regarding the child's behaviour, attitudes and interpersonal relations, and is to be completed by one of the child's parents. In the present investigation, the inventories were completed by

the subjects' mothers.

The original 33 PIC scales comprise the measures obtained on each subjects. The test manual (Wirt, Lachar, Klinedinst and Seat, 1977) outlines, in some detail, the various methods of scale construction employed, and the psychometric properties of each scale. Alpha coefficients of internal consistency are reported for 13 scales. These ranged from .62 to .84 in a normative sample (N = 2390). Test-retest product moment correlations are reported for all 33 scales. On a sample of 55 normative children, the mean PIC scale retest product moment correlation, after an interval of 2 weeks, was .89 (range, .68 to .97). The PIC scales appear to be sufficiently reliable for the purposes of the present investigation. Table 2 contains a list of the 33 PIC scales and a brief description of each.

The use of a parental respondent requires some comment. The PIC does not naively take at face value the descriptions given by parents of their children, but both assesses and controls for the effects of parental distortion. The Lie, F, Defensiveness and Infrequency scales were specifically designed to measure respondent distortion, bias, and response style. The particular contribution made by each of these scales is summerized in Table 2. As has been alluded to in the previous chapter, parental characteristics (including tendencies towards distortion) can themselves be indicative of characteristics or problems

Table 2

PIC Scales

Scale	Description[1]
Lie (L)	Designed to identify a defensive response set manifested by a tendency to ascribe the most virtuous of behaviours, and to deny minor commonly-occuring behaviour problems, in the child described.
F	Designed to identify possible deviant response sets such as deliberate or unintentional exaggeration of symptoms or random responding. In the general clinic population, F appears to reflect relative intensity or severity of symptoms. Atypical response sets tend to be characterized by extremely high F Scale elevations (i.e. T-score ≥ 120).
Defensiveness (DEF)	Designed to measure the tendency, in the respondent, to be defensive in reporting on the child's behaviour.
Adjustment (ADJ)	A screening scale, designed to identify children in need of a psychological evaluation, and as a general measure of poor psychological adjustment. The ADJ scale tends to be elevated in the profiles of the great majority of children seen for psychological evaluations for whatever reason.
Achievement (ACH)	Designed to assist in the identification of children whose academic achievement is significantly below age expectation.
Intellectual Screening (IS)	A screening device to identify children whose difficulties might be due to impaired intellectual functioning. IS is designed to provide an index of need for an in-depth intellectual assessment.
Development (DVL)	Designed to measure poor general intellectual and physical development.

1. The scale descriptions were adapted and summerized from those presented in the PIC manual (Wirt, Lachar, Klinedinst and Seat, 1977).

Table 2 (cont.)

Scale	Description
Somatic Concern (SOM)	Composed of items which measure various health related variables (frequency and seriousness of somatic complaints and illnesses, adjustment to illness, appetite and eating habits, sleep patterns, energy and strength, headaches and stomach aches, and physical basis for symptoms).
Depression (D)	Composed of items judged to reflect childhood depression (brooding, crying spells, lack of energy, anhedonia, pessimism, poor self-concept, uncommunicativeness, etc.).
Family Relations (FAM)	Designed to assess family effectiveness and cohesion (level of parental role effectiveness, ability to cooperate in making family decisions, family involvement in community affairs, presence of feelings of love and happiness in the home, parental emotional adjustment, appropriateness of discipline, and concern for the rights of the child).
Delinquency (DLQ)	A concurrent measure of delinquent tendencies (interpersonal insensitivity, disregard for limits, anti-social tendencies, impulsivity, interpersonal hostility, etc.).
Withdrawal (WDL)	Designed to measure withdrawal from social contact.
Anxiety (ANX)	Containing items that measure limited frustration tolerance, exaggeration of problems and concerns, worries which reflect parental concerns, behavioural and physiological correlates of anxiety, irrational fears and worries, and nightmares.
Psychosis (PSY)	Designed to discriminate children with psychotic symptomatology from normal, behaviourally disturbed non-psychotic, and retarded children. High scoring children tend to be withdrawn and anxious, have poor social skills, and evidence indications of reality distortion.

Table 2 (cont.)

Scale	Description
Hyperactivity (HPR)	Designed to identify children who display characteristics frequently associated with the "hyperkinetic syndrome."
Social Skills (SSK)	Composed of items selected to measure various characteristics which reflect effective social relations in childhood (ability to lead and to follow, level of active participation in organized activities, self-confidence and poise in social situations, and social comprehension and tact in interpersonal relations).
Adolescent Maladjustment (AGM)	Designed to identify emotional disturbance in adolescent populations.
Aggression (AGN)	Contains items reflecting unsocialized, maladaptive aggression (temper tantrums, frequent fights with peers, impulsivity, uncooperativeness, cruelty, and excessive use of projection of blame).
Asocial Behaviour (ASO)	Composed of items reflecting various dimensions of anti-social behaviour (disobedience, disrespect, unreliability, poorly developed morals, lying, stealing and fire setting).
Cerebral Dysfunction (CDY)	Designed to distinguish, among children with behaviour problems, those whose difficulties stem from cerebral dysfunction.
Delinquency Prediction (DP)	Designed to identify preadolescent children at risk for later delinquency.
Ego Strength (ES)	Constructed to identify children whose classroom behaviour suggests extremely good adjustment (good school work, popular with peers, respected by others, dependable, happy, etc.). Low scores reflect good adjustment.

Table 2 (cont.)

Scale	Description
Excitement (EXC)	Designed to measure poor frustration tolerance, distractibility, restlessness, irritability, emotional lability, and motor agitation, as well as symptoms such as periods of screaming and destructiveness.
Externalization (EXT)	Designed to assess the tendency to readily express impulses against society ("conduct disorder").
Infrequency (INF)	Contains items which are extremely skewed in their response distribution for both normal and abnormal children. Designed to identify atypical response sets (T-score 120 indicates invalid profile).
Internalization (INT)	Assesses the tendency to overinhibit impulses ("neurotic traits").
Introversion-Extraversion (I-E)	Reflects the child's social orientation pattern. High elevations indicate introversion (unsociability, quietness, passivity, thoughtfulness, reserve) whereas low scores indicate extraversion (sociability, activity, optimism, impulsivity, outgoingness).
K	Consists of items found to distinguish between normative and psychiatrically disturbed children. Low scores suggest disturbance.
Learning Disability Prediction (LDP)	A prediction scale constructed to identify children 6 through 9 years of age who later were considered to be learning-disabled.
Reality Distortion (RDS)	Composed of items describing behaviours suggestive of impaired reality testing (unusual or impractical ideas, preoccupation with ideas and feelings, excessive day dreaming, unusual verbalizations, peculiar thoughts, inappropriate actions as well as overtly disturbed thought processes).

Table 2 (cont.)

Scale	Description
Sex Role (SR)	Composed of items which tend to be answered differently for boys and girls.
Social Desirability (SD)	Contains items judged to most strongly reflect social desirability or undesirability.
Somatization (SM)	Designed to identify a repetitive or persistent tendency to respond to psychological stress by developing physical disabilities.

of the children. Thus, the PIC's ability to assess parental distortion can provide valuable information about the children.

Procedure

The PIC is one of the questionnaires routinely completed by the parents of children referred to Windsor Western Hospital for neuropsychological assessment. A staff psychometrist gives the PIC to the parents when they bring the children to the hospital for testing. Parents complete the inventory unsupervised, either at that time or within the next few weeks. A computer programme (Gudobba & Grisell, 1979) is employed to score the PICs for 33 scales, and convert raw scores to T-scores. The data for this investigation was obtained from these PIC computer printouts.

As the statistical procedures carried out on this data are rather complex, they will be outlined in four sections. First, the preliminary procedure (an R-type factor analysis) will be described. This will be followed by an outline of the method used to identify subtypes within the subject sample (a Q-type factor analysis). Next, the procedures employed to identify significant differences between subtypes (a multivariate analysis of variance) and characteristics of each subtypes (visual scanning of the subtype mean profiles) will be presented.

Finally, the analyses conducted to shed light on the psychometric reliability of the procedure (two further Q-type analyses) will be described. All of the complex calculations were carried out via appropriate procedures of the SAS computer programme (Helwig & Council, 1979).

Preliminary Procedure. Not all of the PIC scales could be used in certain stages of the data analysis, for reasons which will be dicussed in the next subsection. It was, therefore, important to learn more about the major personality dimensions assessed by the PIC and the scales best reflecting each dimension (at least for the subject sample under investigation). This would aid in the selection of sets of PIC scales which optimally reflect these major personality dimensions. In order to accomplish this, a preliminary R-type factor analysis of the 33 PIC scales was conducted. Product moment correlations between all of the scales were calculated, and the resulting correlational matrix was factored. An iterated principal axis method was employed, with initial communality estimates of 1.00 in the diagonal. Emerging factors with eigenvalues greater than unity were retained and rotated orthogonally to a varimax criterion.

Identification of Subtypes. Many questions in the PIC appear on more than one scale. For example, the Depression and Anxiety scales share 17 items. As Block (1965) has pointed out " . . . the complete covariance

(i.e. correlations of 1·0) between numerous overlapping items can improperly boost scale intercorrelations an appreciable degree" (p. 13). In the case of the Depression and Anxiety scales, for instance, the item overlap alone builds in an intercorrelation of ·46! It was, therefore, imperative to minimize the untoward effects of item overlap. To accomplish this, a reduced data set was created. An examination was made of the observed intercorrelations, and the degree of item overlap, between all 33 PIC scales. Where two scales, which had been found in the preliminary R-type analysis to load most highly on the same factor, demonstrated a built-in intercorrelation (due to item overlap) $\geq$|·20|, and where their observed intercorrelation did not exceed this built-in intercorrelation by at least ·50, only one of the scales was included in the reduced data set. A second consideration in the scale selection process was to ensure that the reduced data set did not unduly distort the factor structure of the PIC. As much as possible, therefore, scales were selected which would optimally represent the PIC factors identified in the preliminary R-type analysis.

In order to identify subtypes within the subject sample, the reduced data set was subjected to a Q-type factor analysis. The matrix of PIC scores was transposed, and product moment correlational analyses for subjects performed. The correlational matrix was factored, using

an iterated principal axis solution with initial communality estimates of 1.00 in the diagonal. Orthogonal rotation to a varimax criterion was carried out on emerging factors which yielded eigenvalues greater than the ratio: number of subjects/number of measures.

Subjects with at least one factor loading $\geq |.50|$, and with an interval $\geq .10$ between their highest and next highest loadings, were retained for further analysis. These subjects were divided into groups according to the factor on which they loaded most highly. The groups represent subtypes within the subject sample.

Significant Inter-Subtype Differences and Subtype Characteristics. The next procedural step was designed to ascertain whether the subtypes differed significantly from eachother. A multivariate analysis of variance (MANOVA) was performed, and an overall between-subtype comparison was made. The subtypes were compared with regard to each of the 33 PIC scales as well as age, sexual composition, WISC Verbal, Performance, and Full Scale IQ, and WRAT Reading, Spelling and Arithmetic centile score. In order to determine whether the mean PIC profile of each subtype differed significantly from that of each other subtype, a further analysis was conducted. The rank order of PIC scale elevations was determined for each subtype, and Spearman correlations were calculated between each pair of subtypes.

For the purpose of clarifying the most salient characteristics of each subtype, the subtype mean PIC T-scores were plotted. These plots represent the group profiles of the subtypes. Inspection and comparison of these group profiles served to identify characteristics of the subtypes.

Psychometric Reliability. The final stage of the data analysis was designed to shed light on the replicability of the Q-type analysis outlined above. The entire subject sample was included in this test of psychometric reliability. Scales which had demonstrated factor loadings $\geq |.70|$ in the preliminary R-type analysis were identified and retained. From these, the Depression scale was excluded because of its extensive item overlap with several other scales. The remaining retained scales were divided into two sets. The assignment of scales to sets was carried out with two concerns in mind. Within each set, the untoward effects of item overlap were minimized via the following method: scales which had been found in the preliminary R-type analysis to load most highly on the same factor, which demonstrated built-in intercorrelations (due to item overlap) $\geq |.20|$, and which did not demonstrate observed intercorrelations at least .50 higher than their built-in intercorrelations, were assigned to different sets. Secondly, due consideration was given to the importance of ensuring at least rough equivalence between the two sets of scales with regard to the factors

they reflected, and the factor loadings they exhibited, in the preliminary R-type analysis.

Each of these two newly created data sets was then subjected to a Q-type factor analysis. In each analysis, the T-score matrix was transposed, and product moment correlational analyses for subjects performed. The resulting correlational matrix was factored using an iterated principal axis solution with initial communality estimates of 1·00 in the diagonal. Four factors were retained and rotated orthogonally to a varimax criterion.

Subjects who demonstrated at least one factor loading $\geq \cdot 50$, with an interval $\geq \cdot 10$ between their highest and next highest loadings, were retained for further analysis. Since very few subjects (generally 1 or 2) loaded highly and negatively on any one factor, such subjects were excluded. The remaining subjects were divided into groups according to the factor on which they loaded most highly.

The next step involved the construction of a matrix comparing the grouping of subjects in the two analyses. From the matrix, the degree of congruence between groupings was assessed by calculating the percentage of agreement and Cramer's index (φ') of strength of association (Hays, 1963). The degree to which subjects assigned to the same group in one analysis were also grouped together in the other was interpreted as an indication of psychometric reliability.

CHAPTER III

RESULTS

The results will be presented in the following order: (1) the preliminary R-type factor analysis; (2) the identification of subtypes; (3) the significance of inter-subtype differences and notable subtype characteristics; and (4) the test of psychometric reliability. Table 3 presents the sample means and standard deviations for each PIC scale, and the mean PIC profile for the subject sample is presented in Figure 1.

Preliminary R-type Factor Analysis. Results of the preliminary analysis indicate that, for the subject sample employed, the 33 PIC scales assess 7 independent personality dimensions. In the R-type factor analysis, 7 factors accounting for 76.2% of the common variance were identified and rotated. The intercorrelations among the PIC scales are reported in Appendix A. Table 4 presents the relative import of each of the 7 factors, and the rotated factor pattern is presented in Table 5. No scale evidenced more than 1 factor loading $\geq |.50|$, 28 of the 33 scales loaded $\geq |.50|$ on 1 factor, and only the Sex Role scale failed to evidence a factor loading $\geq .46$.

Table 3

PIC Summary Statistics For Total Sample

PIC Scale	Mean	Standard Deviation
Lie	48.2	9.8
F	61.8	16.1
Defensiveness	46.3	10.9
Adjustment	72.0	16.1
Achievement	68.1	9.1
Intellectual Screening	74.4	18.5
Development	65.9	10.1
Somatic Concern	59.5	14.1
Depression	60.3	12.7
Family Relations	53.1	12.2
Delinquency	62.1	15.4
Withdrawal	54.8	13.7
Anxiety	56.6	9.8
Psychosis	60.9	15.4
Hyperactivity	57.8	14.6
Social Skills	59.8	13.2
Adolescent Maladjustment	64.2	12.3
Aggression	57.1	17.0
Asocial Behavior	60.8	14.5
Cerebral Dysfunction	53.9	12.1
Delinquency Prediction	51.5	9.7
Ego Strength	66.0	10.9
Excitement	57.2	11.4
Externalization	62.9	14.9
Infrequency	55.5	16.0
Internalization	60.2	12.5
Introversion-Extraversion	49.7	10.9
K	45.6	11.2
Learning Disability Predict.	65.2	12.1
Reality Distortion	59.6	15.8
Sex Role	44.6	12.8
Social Desirability	41.1	11.6
Somatization	59.6	11.9

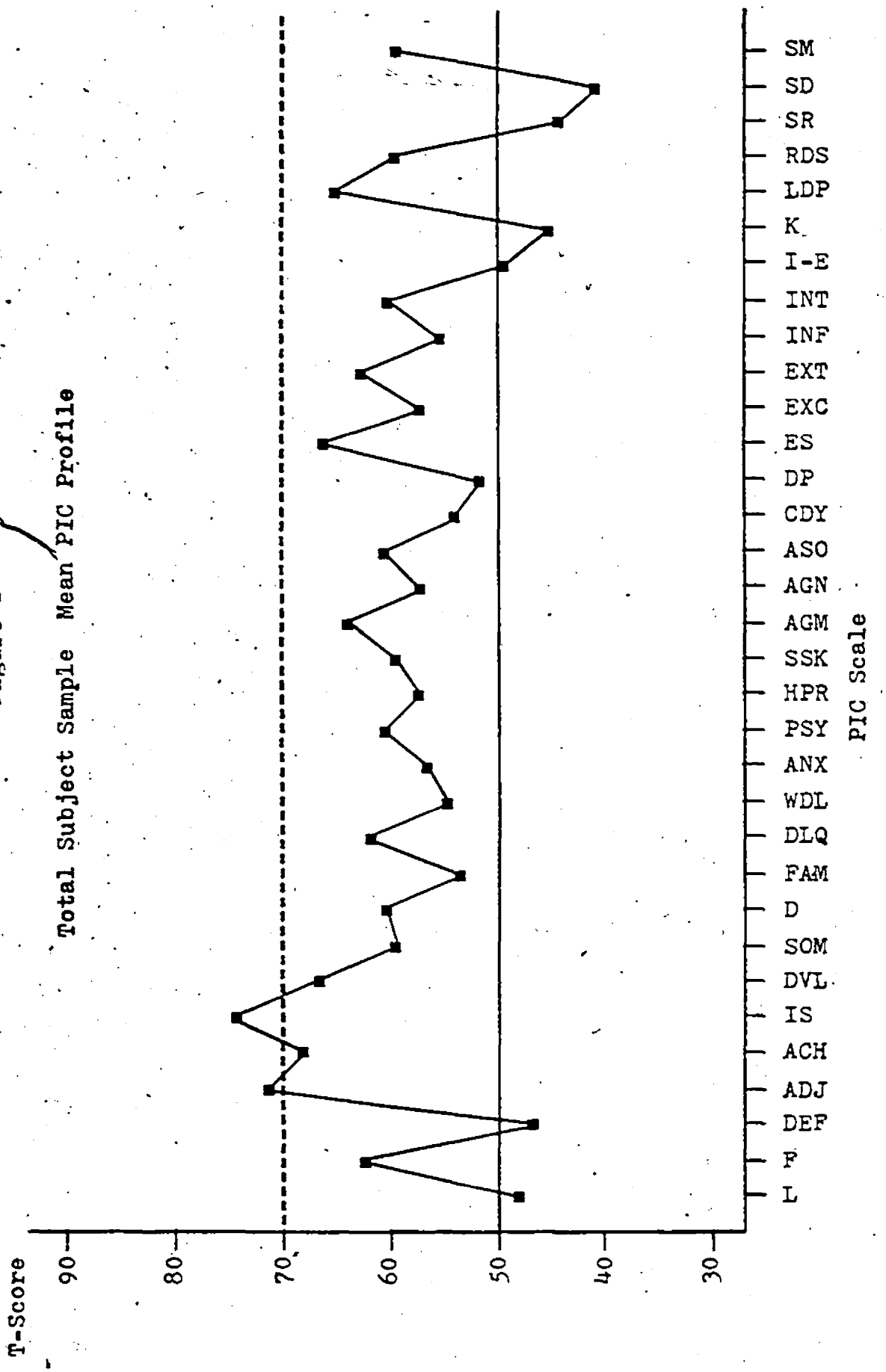


Figure 1

Total Subject Sample Mean PIC Profile

Table 4

Relative Import of Each R-Type Factor

Factor	Eigenvalue	Portion of Common Variance	Cumulative Portion Of Common Variance
I	12.06	.37	.37
II	4.19	.13	.49
III	2.89	.09	.58
IV	2.02	.06	.64
V	1.63	.05	.69
VI	1.22	.04	.73
VII	1.11	.03	.76

Table 5

Rotated Factor Pattern from R-Type Factor Analysis of 33 PIC Scales

	Factor							
Scale	I	II	III	IV	V	VI	VII	h^2
L	-.60	-.07	.04	-.22	-.18	-.31	-.04	.55
F	.47	.25	.70	.10	.09	.01	.08	.80
DEF	-.21	.08	.06	.01	-.20	-.52	-.25	.43
ADJ	.57	.40	-.01	.27	.18	.17	.42	.80
ACH	[illegible]	.29	-.04	.78	.07	.02	.01	.72
IS	.03	.07	.09	.61	-.04	.11	.06	.41
DVL	.08	.08	.07	.91	.03	.07	.14	.87
SOM	.04	.17	.87	-.03	.04	.02	-.15	.81
D	.25	.90	.16	.13	.05	.05	-.01	.91
FAM	.27	.12	.03	-.03	.80	.12	.01	.75
DLQ	.81	.18	.23	.03	.19	-.22	-.04	.83
WDL	.04	.67	.29	.12	.01	-.10	-.07	.56
ANX	.05	.82	.13	.11	.04	.09	-.03	.72
PSY	.30	.64	.15	.18	-.08	.15	.41	.75
HPR	.73	-.12	-.17	.11	-.12	.29	.24	.74
SSK	.45	.48	-.06	.19	.18	.09	.56	.83
AGM	.75	.17	.13	.16	.36	.09	.17	.80
AGN	.68	.35	.08	.09	-.06	.12	.30	.71
ASO	.82	.04	.32	-.03	.24	.16	-.07	.88
CDY	.08	-.06	-.02	.06	-.04	.13	.48	.26
DP	.29	-.17	.30	.11	.48	-.04	-.11	.46
ES	.49	.26	.08	.32	.30	.13	.20	.57
EXC	.43	.09	.11	.21	-.08	.64	.12	.69
EXT	.89	-.12	.17	.04	.15	.26	.09	.93
INP	.00	.16	.70	.09	.06	-.02	.14	.54
INT	.12	.79	.44	.13	.01	.08	.04	.85
I-E	-.63	.43	-.04	.14	.08	-.33	.00	.72
K	-.70	-.39	-.06	.00	-.15	-.32	.00	.78
LDP	.19	.14	.21	.47	.28	.55	-.03	.71
RDS	.34	.36	.12	.13	.00	.46	.15	.52
SR	-.32	-.08	.02	-.18	.08	-.31	-.22	.30
SD	-.70	-.39	-.03	-.21	-.31	-.21	-.26	.89
SM	.09	.27	.86	.05	.03	.12	-.09	.86

Identification Subtypes. Fifteen scales were selected for inclusion in the reduced data set. These are presented, together with their highest factor loadings, in Table 6. All 7 PIC factors, identified in the preliminary R-type factor analysis, are reflected in the reduced data set in rough proportion to the number of scales loading most highly on each R-type factor.

Appendix B reports the extent of item overlap, and intercorrelations built in by this overlap, among the scales included in the reduced data set. Only one pair of scales, loading most highly on the same R-type factor, evidenced sufficient item overlap to build in an intercorrelation $\geq |.20|$ (Adolescent Maladjustment and Asocial Behavior). The observed intercorrelation between these two scales (see Appendix A) was .51 greater than their built-in intercorrelation, indicating that their observed relationship was not primarily artifactual. Thus, the untoward effects of item overlap had been minimized in the selection of scales for inclusion in the reduced data set.

The analysis of the reduced data set indicates that the subject sample is comprised of 4 subtypes of learning-disabled children which differ from eachother in terms of personality functioning. In the Q-type factor analysis conducted on the reduced data set, the eigenvalue criterion to limit factoring was 6.67 (100 subjects/15 scales).

Table 6

Highest Factor Loadings of Scales
In Reduced Data Set

	Factor						
Scale	I	II	III	IV	V	VI	VII
ASO	.82						
AGM	.75						
AGN	.68						
K	-.70						
I-E	-.63						
INT		.79					
WDL		.67					
SOM			.87				
F			.70				
ACH				.78			
IS				.61			
FAM					.80		
LDP						.55	
RDS						.46	
SSK							.56

Four factors, accounting for 69.5% of the common variance, were retained and rotated. The rotated factor pattern is presented in Table 7. Seventy-seven of the 100 subjects met the criteria for assignment to factors or subtypes. Of the remaining 23 subjects, 13 failed to demonstrate sufficient separation between their highest and next highest factor loadings to permit assignment to a subtype, and 10 did not exhibit a factor loading $\geq .50$. The 4 factors are clearly unipolar, as all assigned subjects evidence positive loadings on the factors to which they were assigned. Subject assignment to subtypes was as follows:

34 subjects assigned to Subtype 1 (44%)
20 subjects assigned to Subtype 2 (26%)
10 subjects assigned to Subtype 3 (13%)
13 subjects assigned to Subtype 4 (17%)

Significance of Inter-Subtype Differences and Notable Subtype Characteristics. Summary statistics with regard to each subtype, as well results of the MANOVA procedure, are presented in Table 8. Overall, the subtypes differed significantly from eachother ($p<.001$ on the Hotelling-Lawley Trace, Pillai's Trace, and Wilk's Criterion). Differences between subtypes were statistically significant ($p\leq.01$) on 28 of the 33 PIC scales. Among the PIC variables, only the Achievement, Intellectual Screening, Development, Cerebral Dysfunction and Learning Disability Prediction scales did not differ significantly between

Table 7

Rotated Factor Pattern from Q-type Factor Analysis of Reduced Data Set

Subject	Factor I	Factor II	Factor III	Factor IV
1	.25	.70	-.08	.44
2	.33	.41	.39	.68
3	.26	-.04	.71	-.37
4	-.12	.57	-.21	.50
5	.84	-.11	-.11	.28
6	-.08	-.36	.52	.29
7	.57	.31	.12	.33
8	.89	-.16	.22	.18
9	-.40	.54	.30	-.13
10	-.35	.57	-.10	.45
11	.72	.18	-.17	-.22
12	.29	.22	.05	.36
13	.89	.03	.24	.29
14	.10	.07	.87	.13
15	.01	.58	-.05	.45
16	-.11	.62	.40	.25
17	-.15	.12	-.37	.55
18	-.34	-.14	.85	.11
19	.35	.58	.13	.60
20	.02	.80	.42	.23
21	-.31	.10	.21	.87
22	.78	.17	.17	-.40
23	.35	.12	.82	-.18
24	.80	-.07	-.12	-.21
25	-.38	.27	.01	.04
26	.81	.10	-.07	.19
27	.43	.17	-.12	.60
28	-.29	.13	.16	.35
29	.62	.49	.18	.38
30	.72	.10	.40	.17
31	.46	.56	-.28	.31
32	.32	.79	.12	.31
33	.61	.40	.31	.48
34	.72	-.15	.49	-.31
35	-.23	.02	-.01	-.15

Table 7 (cont.)

Subject	Factor I	Factor II	Factor III	Factor
36	.42	.05	.70	.00
37	-.42	.53	-.02	.64
38	.52	.21	.21	.49
39	-.16	.13	.65	.57
40	.91	.03	-.09	-.15
41	.46	.14	-.25	.04
42	.25	.50	.10	.22
43	.71	.55	-.09	.30
44	.12	.05	-.38	.16
45	.47	-.50	-.17	-.08
46	.22	.06	.46	.23
47	.69	.36	-.24	.34
48	.82	.26	.29	-.04
49	.75	.18	.01	.42
50	.26	.78	-.16	-.03
51	.24	.15	-.21	.84
52	.19	.60	.13	.04
53	.81	.42	.01	-.06
54	-.11	.20	.34	-.17
55	.64	-.01	.23	.59
56	.19	.69	-.03	.07
57	-.09	.48	-.18	.52
58	.30	.44	.46	-.53
59	.01	.51	-.06	.31
60	.13	.62	.31	.18
61	.69	.51	.26	.09
62	.19	.04	.90	.27
63	.84	.06	-.18	.06
64	.23	.12	.20	.48
65	.16	.22	-.47	.61
66	.74	.34	.04	.39
67	.19	.74	-.27	-.37
68	.77	.24	-.05	.39
69	.67	.01	.40	-.42
70	-.20	.85	.16	-.01
71	.85	-.16	-.25	-.20

Table 7 (cont.)

Subject	Factor I	Factor II	Factor III	Factor IV
72	.50	.49	.53	.20
73	.26	.36	.26	.32
74	.46	.20	.37	.63
75	.68	-.11	.54	.07
76	.86	-.30	.28	-.12
77	.17	.63	.56	.37
78	.12	-.14	.15	.54
79	-.08	.17	.00	.90
80	.84	-.01	.22	.17
81	.31	.19	.24	-.09
82	-.15	.63	-.01	.01
83	-.34	.53	.64	-.09
84	.64	.29	.62	.06
85	.37	.21	.06	.18
86	.10	.54	.25	.52
87	.55	.23	-.25	.26
88	.59	-.33	.10	-.47
89	-.54	.15	.68	.28
90	.30	.55	-.12	.49
91	.85	.04	.02	.23
92	.07	.75	.20	.41
93	.64	.09	-.18	.40
94	.93	-.18	-.12	-.08
95	.63	.33	.12	-.25
96	.21	.49	-.08	.68
97	.10	-.12	.04	-.27
98	.41	.60	-.07	.26
99	-.39	.50	.32	.27
100	.05	.34	.84	.26
Eigenvalue	32.14	18.20	11.32	7.80

Table 8

Subtype Summary Statistics and
Significance of Inter-Subtype Differences

Variable	Subtype 1	Subtype 2	Subtype 3	Subtype 4	Significance
Sex	79% male	85% male	100% male	85% male	not significant
Age	10.1[1]	10.3	10.7	11.0	not significant
Verbal IQ	95.2	94.5	91.5	95.5	not significant
Performance IQ	103.7	101.5	104.7	100.8	not significant
Full Scale IQ	99.1	97.8	97.5	97.8	not significant
Reading Centile	19.9	25.2	15.5	31.6	not significant
Spelling Centile	14.0	17.8	10.1	16.2	not significant
Arith. Centile	20.7	17.3	16.7	19.4	not significant

[1]Subtype mean.

Table 8 (cont.)

Variable	Subtype 1	Subtype 2	Subtype 3	Subtype 4	Significance
L	51.7	45.2	57.0	40.2	$p \leq .01$
F	50.4	71.3	81.1	66.6	$p \leq .01$
DEF	48.9	46.0	53.0	37.4	$p \leq .01$
ADJ	64.5	86.3	60.7	80.4	$p \leq .01$
ACH	70.5	70.0	63.2	67.5	not significant
IS	83.1	75.3	65.5	72.5	not significant
DVL	68.0	67.6	62.1	67.4	not significant
SOM	52.1	62.4	82.9	55.2	$p \leq .01$
D	54.3	73.7	61.0	56.2	$p \leq .01$
FAM	48.7	51.5	52.6	65.2	$p \leq .01$
DLQ	53.9	68.1	65.2	77.5	$p \leq .01$
WDL	50.8	64.8	60.0	48.8	$p \leq .01$
ANX	53.6	66.4	55.8	50.6	$p \leq .01$

Table 8 (cont.)

Variable	Subtype 1	Subtype 2	Subtype 3	Subtype 4	Significance
PSY	55.3	78.4	54.4	55.9	$p \leq .01$
HPR	52.8	64.7	44.6	69.9	$p \leq .01$
SSK	53.6	73.6	50.3	63.5	$p \leq .01$
AGM	57.7	68.1	60.0	78.2	$p \leq .01$
AGN	49.6	73.2	46.8	65.1	$p \leq .01$
ASO	51.1	66.1	64.0	77.6	$p \leq .01$
CDY	51.5	55.8	48.2	54.9	not significant
DP	49.1	49.0	54.0	58.5	$p \leq .01$
ES	61.2	71.8	61.7	71.2	$p \leq .01$
EXC	54.8	62.2	49.6	59.6	$p \leq .01$
EXT	53.6	72.3	57.8	78.9	$p \leq .01$
INF	50.5	61.3	74.7	48.5	$p \leq .01$
INT	54.8	71.6	65.3	51.8	$p \leq .01$

Table 8 (cont.)

Variable	Subtype 1	Subtype 2	Subtype 3	Subtype 4	Significance
I-E	54.4	48.6	52.6	38.5	$p \leq .01$
K	53.1	36.5	51.6	37.7	$p \leq .01$
LDP	62.1	67.7	65.0	70.2	not significant
RDS	54.6	72.6	51.9	60.7	$p \leq .01$
SR	49.2	36.7	51.9	39.6	$p \leq .01$
SD	47.6	32.6	48.5	32.2	$p \leq .01$
SM	53.1	64.9	76.1	54.7	$p \leq .01$
Mean	55.2	62.9	59.1	59.2	
Median	53.4	66.4	57.8	59.6	

subtypes. Statistically significant differences were not found for subject age, WISC Verbal, Performance or Full Scale IQ, WRAT Reading, Spelling or Arithmetic centile score, or sexual composition.

The rank order of the 33 PIC scales was determined for each subtype. Spearman correlational analyses were performed on this data in six paired-subtype comparisons. In this procedure, a statistically significant correlation would tend to contradict the hypothesis that the pair of subtypes in question demonstrate different profile configurations. Results of the Spearman procedure, presented in Table 9, support the notion that the Subtype 3 profile differs in configuration from each of the others. However, the results tend to contraindicate differences in profile configuration between other subtype pairs.

Next, for each subtype, the rank order of the 23 PIC personality scales (i.e. excluding the validity, response style, and school-related scales) was determined. Spearman correlational analyses were performed on this data in six paired-subtype comparisons. The results of these analyses are presented in Table 9. None of the correlations reached statistical significance, except for that between Subtypes 1 and 2 ($r_S = .50$, $p < .01$). In other words, results of five of the six paired-subtype

Table 9

Spearman Rank Correlations and Corresponding Significance Levels of Between-Subtype Comparisons[1]

	Subtype 1	Subtype 2	Subtype 3	Subtype 4
Subtype 1		.54 ($p<.01$)	.21 (n.s.)	.22 (n.s.)
Subtype 2	.62 ($p<.01$)		.16 (n.s.)	.40 (n.s.)
Subtype 3	.32 (n.s.)	.36 (n.s.)		.04 (n.s.)
Subtype 4	.50 ($p<.01$)	.64 ($p<.01$)	.28 (n.s.)	

[1]Figures below the diagonal indicate the Spearman correlation coefficients (and corresponding significance levels) calculated on the rank order of all 33 PIC scales. Figures above the diagonal indicate the same statistics calculated on the rank order of the 23 PIC personality scales only.

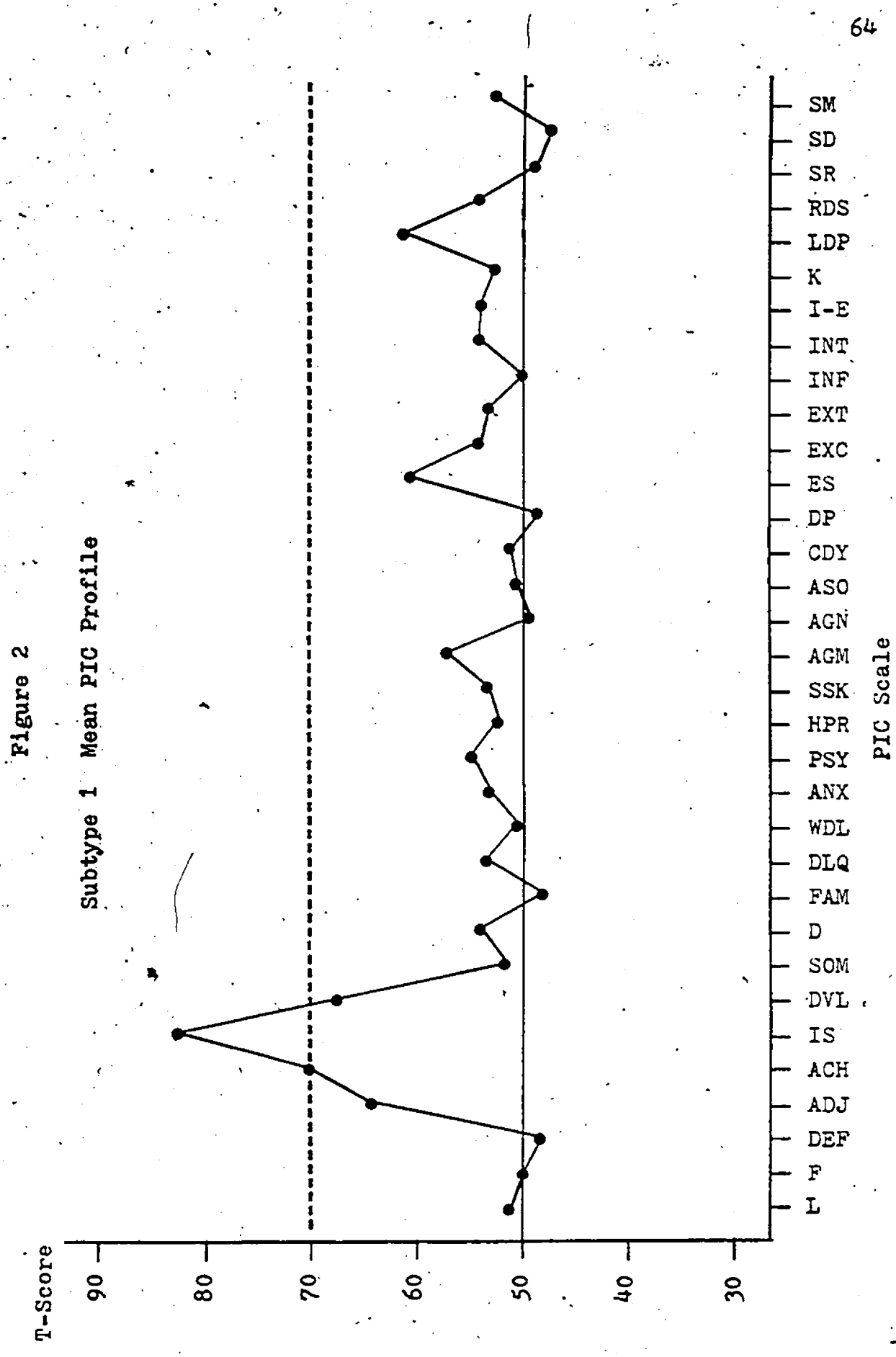
comparisons offer support for the hypothesis that each subtype demonstrates a distinct personality pattern.

The mean PIC profiles of the 4 subtypes are presented in Figures 2 through 5. All 4 subtype profiles exhibit at least moderate elevations (i.e. T-scores ≥ 60) on the Adjustment, Achievement, Intellectual Screening, Development, Ego Strength and Learning Disability Prediction scales. None of the subtype profiles exhibited even moderate elevations on the Lie, Defensiveness, Cerebral Dysfunction, Deliquency Prediction, Sex Role, or Social Desirability scales. The overall profile elevation was lowest for Subtype 1 (mean T-score = 55.2, median T-score = 53.4) and highest for Subtype 2 (mean T-score = 62.9, median T-score = 66.4).

Table 10 presents the scales which are notably higher or lower on one subtype profile than on any other (comparative elevations), and the R-type factor to which each scale belongs. The Subtype 1 profile is, again, least elevated, demonstrating comparative elevations on none of the scales reflecting social or emotional functioning. The Subtype 2 profile evidences the greatest number of comparative elevations, and is remarkable for comparative elevations on all 5 scales reflecting R-type factor II (Depression, Anxiety, Psychosis, Withdrawal and Internalization). All 4 scales reflecting R-type factor III (F, Somatic Concern, Infrequency and Somatization), and no

Figure 2

Subtype 1 Mean PIC Profile



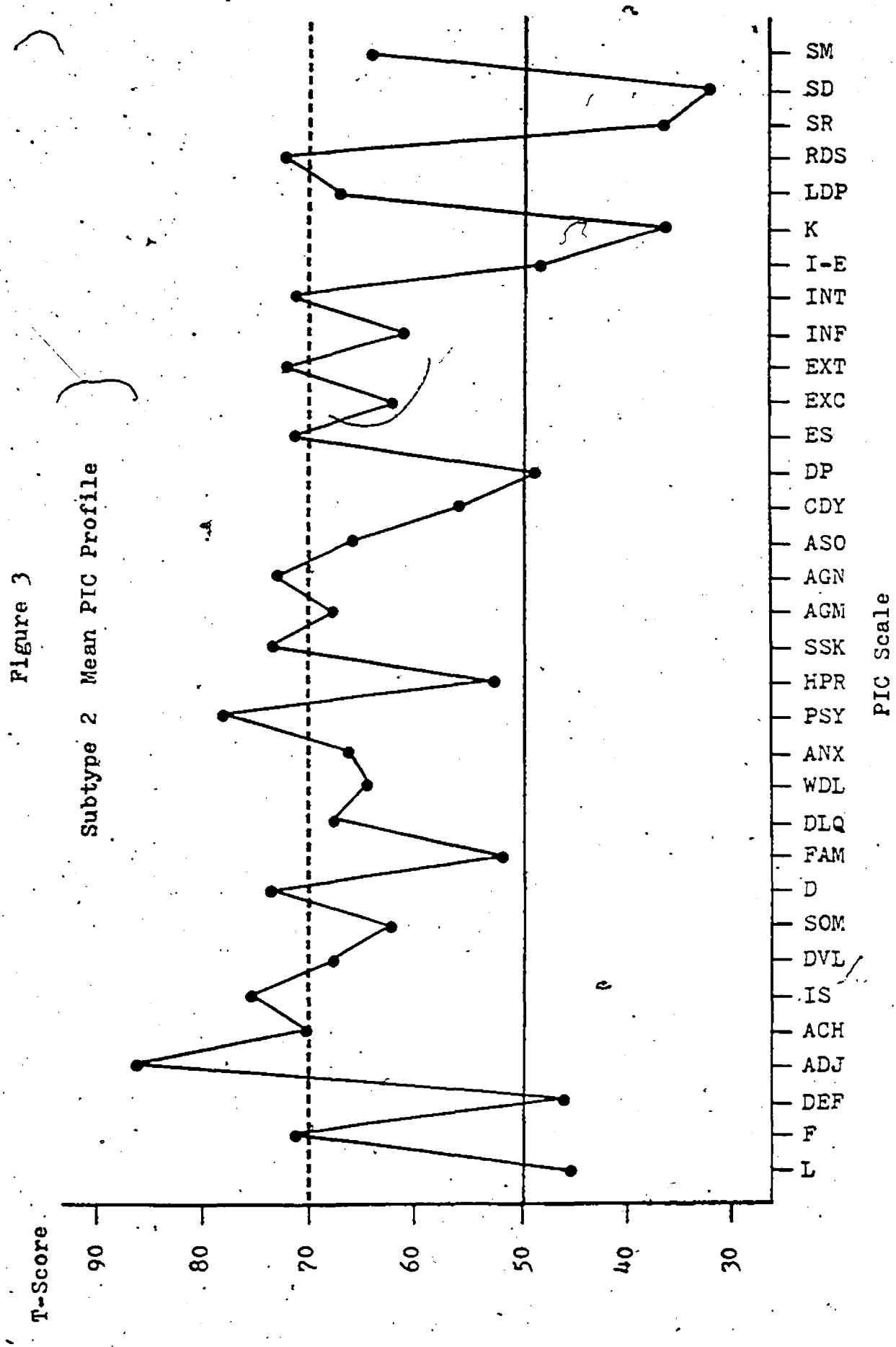


Figure 3 Subtype 2 Mean PIC Profile

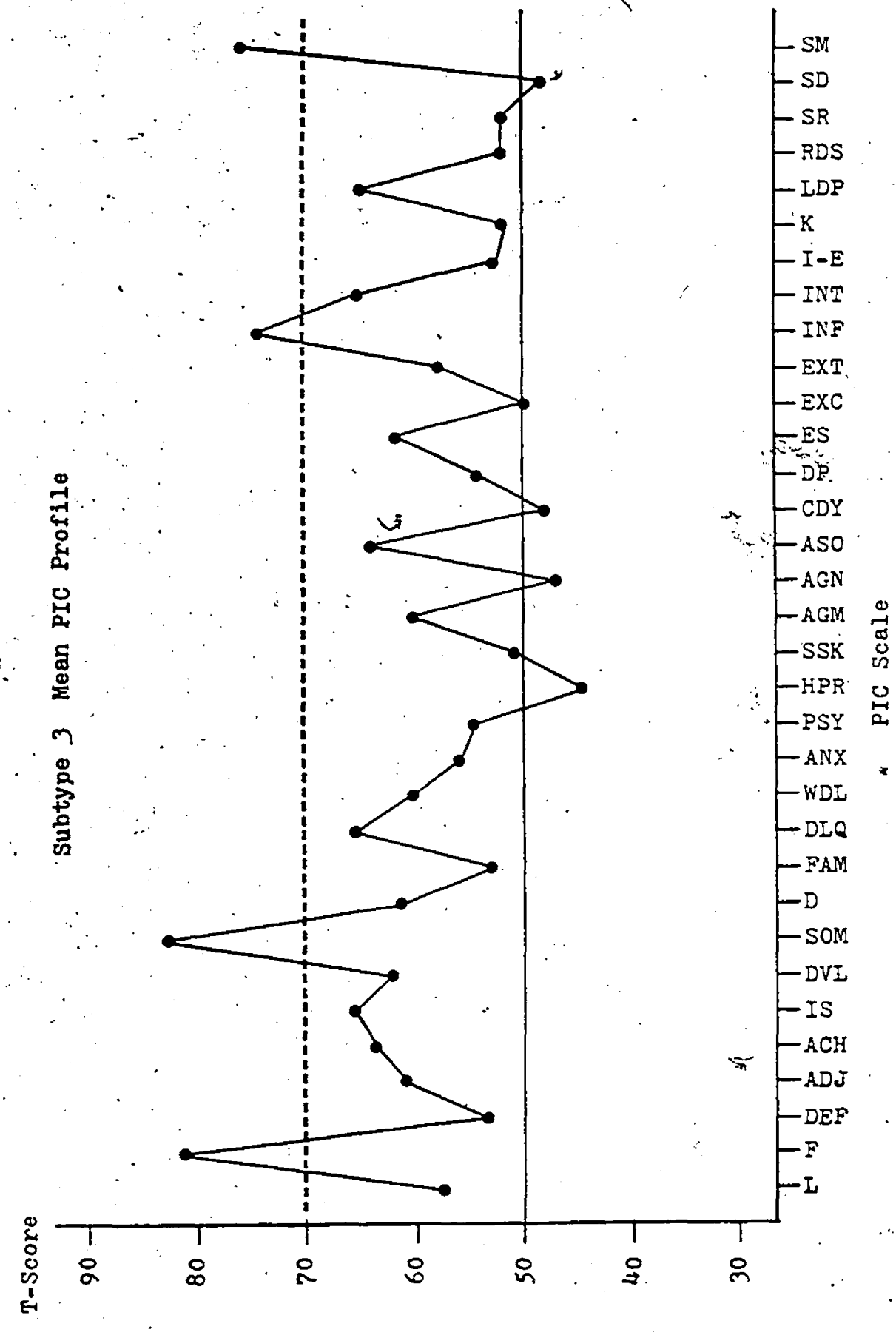


Figure 4

Subtype 3 Mean PIC Profile

Figure 5

Subtype 4 Mean PIC Profile

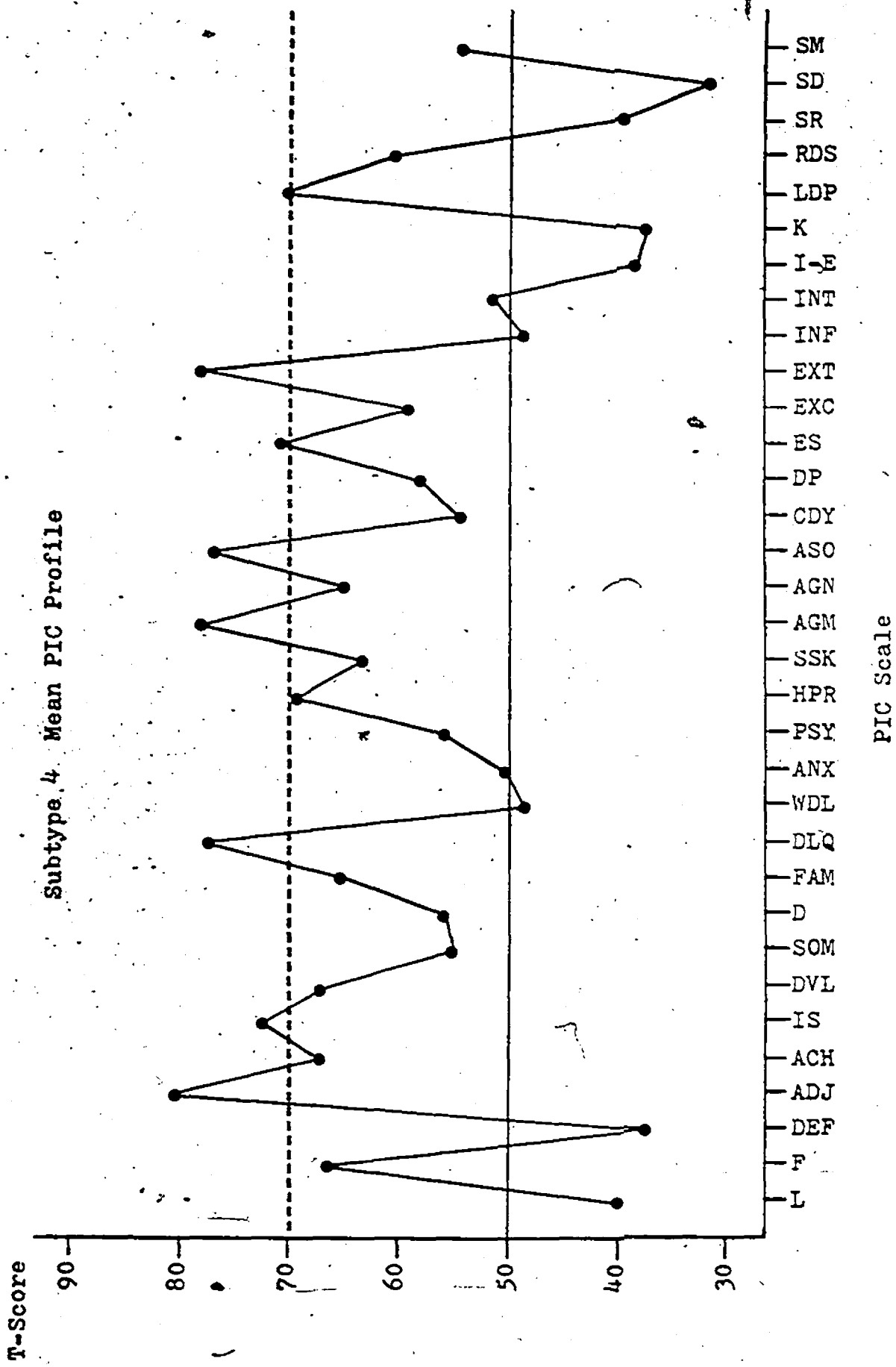


Table 10

Comparative T-Score Elevations

Subtype	Comparatively[1] High T-Score	R-Type[2] Factor
1	Intellectual Screening	IV
2	Depression	II
	Anxiety	II
	Psychosis	II
	Social Skills	VII
	Reality Distortion	VI
	Adjustment	I
	Withdrawal	II
	Aggression	I
	Internalization	II
3	F	III
	Somatic Concern	III
	Infrequency	III
	Somatization	III
4	Adolescent Maladjustment	I
	Asocial Behavior	I
	Delinquency	I
	Family Relations	V
	Externalization	I
	Hyperactivity	I

Subtype	Comparatively[3] Low T-Score	R-Type Factor
1	none	
2	none	
3	none	
4	L	-I[4]
	Defensiveness	-VI
	Internal-External	-I

[1] T-Score $\geq$ 65 and at least 5 higher than for any other subtype.

[2] Factor on which scale loaded most highly in R-Type analysis.

[3] T-Score $\leq$ 45 and at least 5 lower than for any other subtype.

[4] Highest loading was negative on the factor indicated.

others, are comparatively elevated on the Subtype 3 profile. The Subtype 4 profile is most notable for its emphasis on R-type factor I. It is comparatively elevated on 5 of the 8 positive R-type factor I scales, and comparatively low on 2 of the 5 negative R-type factor I scales. The four subtypes clearly differ from eachother with regard to personality functioning.

Psychometric Reliability. The analyses designed to shed light on the replicability of the subtypes supports the notion of psychometric reliability. Sixteen PIC scales (excluding the Depression scale) evidenced R-type factor loadings $\geq |.70|$. The 2 sets into which these scales were divided (termed "Rep 1" and "Rep 2") are presented, together with their highest R-type factor loadings, in Table 11. Rough equivalence between the scales of Rep 1 and Rep 2 was achieved with regard to the factors reflected and factor loadings exhibited.

The effects of item overlap, among the scales of data set Rep 1 and of data-set Rep 2, are reported in Appendix C. Only the Adolescent Maladjustment and A-social Behavior scales evidenced sufficient overlap to build in an intercorrelation $\geq |.20|$. As noted above, the observed intercorrelation of these 2 scales is sufficiently high to preclude their observed relationship from being primarily artifactual. Thus, the undue effects of item overlap were minimized in both Rep 1

Table 11

Highest Factor Loadings of Scales
In Data Sets Rep 1 and Rep 2

Data Set	Scale	Factor I	II	III	IV	V
Rep 1	ASO	.82				
	AGM	.75				
	K	-.70				
	INT		.78			
	SOM			.87		
	F			.70		
	ACH				.78	
	FAM					.80
Rep 2	EXT	.89				
	DLQ	.81				
	HPR	.73				
	SD	-.70				
	ANX		.82			
	SM			.86		
	INF			.70		
	DVL				.91	

and Rep 2.

In the Q-type factor analysis of Rep 1, four factors accounting for 85.4% of the common variance were rotated. The rotated factor pattern is presented in Table 12. Eighty-four subjects were assigned to factors from this analysis. In the Q-type analysis of Rep 2 four factors accounting for 81.6% of the common variance were rotated. Table 13 presents the rotated factor pattern from this analysis. Eighty-six subjects were assigned to factors.

Sixty-one subjects were assigned to factors in the analyses of both Rep 1 and Rep 2. Table 14 presents the matrix in which the grouping of subjects from the two analyses is compared. Considerable agreement is apparent between the two replication analyses. The second replication analysis grouped together 28 of the 35 subjects from factor I of the first replication analysis, 8 of the 11 subjects from factor II of the first analysis, 5 of the 6 subjects from factor III of the first analysis, and 7 of the 9 subjects from factor IV of the first analysis. In summary, the two analyses demonstrated on agreement or replication rate of 79%.

Cramer's index of strength of association (φ'), which can range from 0 (complete independence) to 1.0 (complete dependence), provided a statistical measure of the degree of correspondence between the two replication

Table 12

Rotated Factor Pattern from Q-type Factor Analysis of Data Set Rep 1

Subject	Factor I	Factor II	Factor III	Factor IV
1	.95	.02	.10	-.09
2	.89	-.22	.29	-.12
3	-.28	.02	.23	.80
4	.65	.05	.03	.08
5	.05	.84	-.12	-.40
6	.25	.22	.72	.01
7	.62	.24	-.09	.46
8	.05	.96	.08	.10
9	.78	-.03	.47	.33
10	.85	-.07	.29	-.03
11	.00	.54	-.66	.53
12	.55	.74	.11	.30
13	.28	.67	.04	.18
14	.17	-.48	.63	.41
15	.89	-.34	.07	-.15
16	.74	-.34	.38	.17
17	.45	.24	.65	-.34
18	.07	-.58	.77	.27
19	.92	-.31	-.17	.03
20	.77	-.25	.35	.46
21	.81	-.19	.12	-.42
22	-.08	.38	-.29	.84
23	.22	-.03	.67	.56
24	-.26	.90	.12	.19
25	.67	-.38	-.29	-.04
26	.55	.73	-.26	.01
27	.77	.13	-.38	.06
28	.29	-.75	-.49	.03
29	.86	-.06	-.26	.33
30	.01	.61	.47	.46
31	.72	.34	-.42	.15
32	.73	-.14	-.02	.50
33	.90	-.08	-.25	.19
34	-.21	.58	.29	.62
35	.72	.22	-.10	.40

Table 12 (cont.)

Subject	Factor I	Factor II	Factor III	Factor IV
36	-.01	-.19	.93	.12
37	.88	-.41	.05	-.21
38	.65	.50	.06	-.05
39	.50	-.60	.58	-.10
40	.05	.67	-.52	.36
41	.26	.01	-.86	.18
42	.93	-.17	-.06	-.17
43	.91	.27	-.18	.18
44	.34	.17	-.72	.22
45	-.32	.85	-.08	-.03
46	.67	.19	.54	-.37
47	.60	.54	-.53	-.02
48	.31	.40	-.18	.66
49	.69	.30	-.56	.01
50	.72	.25	-.23	.49
51	.67	.07	-.28	-.67
52	.26	-.13	.12	.72
53	.34	.48	-.34	.61
54	-.14	-.30	-.10	.71
55	.34	.57	.28	-.33
56	.60	-.27	-.38	.55
57	.95	.10	-.06	-.16
58	.09	.18	.55	.69
59	.66	.02	.02	.47
60	.76	.10	.02	.51
61	.46	.22	.13	.76
62	.42	-.07	.81	.35
63	.22	.79	-.31	-.13
64	.92	.28	-.24	.11
65	.64	-.02	-.45	-.34
66	.69	.61	.04	-.05
67	.41	.28	-.15	.81
68	.54	.77	-.09	-.07
69	-.13	.61	.33	.58
70	.68	-.16	.29	.41
71	-.09	.96	-.23	.00

Table 12 (cont.)

Subject	Factor I	Factor II	Factor III	Factor IV
72	.56	.14	.26	.69
73	.84	.22	.19	.27
74	.78	.30	.40	-.06
75	-.22	.47	.42	.47
76	-.32	.81	.04	.28
77	.64	-.22	.57	.44
78	.27	-.15	-.35	-.34
79	.66	-.09	.01	-.63
80	-.03	.91	-.04	.27
81	.18	.26	.39	.25
82	.25	.10	.46	.28
83	.33	-.34	.48	.72
84	.22	-.07	.32	.86
85	.79	-.05	.08	.53
86	.85	.19	.07	.27
87	.29	.03	-.86	.02
88	-.33	.82	-.12	.35
89	.36	-.47	.80	.10
90	.75	-.12	-.56	.12
91	-.01	.96	-.22	-.04
92	.84	-.32	.36	.20
93	.44	.77	-.43	-.09
94	-.30	.85	-.28	.03
95	.36	.45	-.45	.67
96	.95	.00	-.06	-.26
97	-.37	.19	.28	.03
98	.76	-.20	-.34	.22
99	.54	-.76	.12	.28
100	.57	-.23	.59	.50
Eigenvalue	35.62	22.71	17.20	9.87

Table 13

Rotated Factor Pattern from Q-type Factor Analysis of Data Set Rep 2

Subject	Factor I	Factor II	Factor III	Factor IV
1	.93	-.06	.17	.23
2	.84	.33	.22	.06
3	-.12	.06	.50	.36
4	.96	-.01	-.09	.14
5	.22	.03	.14	.60
6	-.12	.57	.36	-.49
7	.51	.57	.57	-.12
8	.01	-.36	.38	.76
9	.50	.13	.38	-.68
10	.94	.17	-.04	.20
11	-.19	.46	.85	.02
12	.38	-.13	.39	.77
13	.33	.12	.64	.55
14	-.08	.82	.39	-.24
15	.93	.07	-.03	.19
16	.39	.57	-.09	.14
17	.78	-.25	.04	.35
18	-.33	.68	-.15	-.42
19	.75	.48	.19	.28
20	.65	.76	.11	.02
21	.90	.07	-.03	-.10
22	.11	.23	.91	.12
23	-.14	.51	.66	-.14
24	.26	-.54	-.25	.42
25	.69	.19	.45	-.53
26	.73	-.23	.40	-.24
27	.77	-.01	.53	.24
28	-.05	.76	.09	-.33
29	.54	.17	.36	.28
30	.00	-.07	-.09	.72
31	.51	-.17	-.31	.58
32	.35	.61	.23	.14
33	.46	.55	.68	-.10
34	-.52	-.35	.12	.19
35	.22	.83	.46	-.20

Table 13 (cont.)

Subject	Factor I	Factor II	Factor III	Factor IV
36	-.30	.65	.01	-.50
37	.95	.12	-.13	-.16
38	.63	-.09	-.05	.75
39	.01	.94	-.18	-.08
40	-.39	-.27	.66	.28
41	.54	-.12	.68	-.34
42	.89	.10	-.26	.33
43	.84	.12	.52	-.08
44	.26	.48	.36	.50
45	.06	-.82	.08	-.16
46	.66	-.18	-.27	.32
47	.34	.18	.63	.53
48	.29	-.12	.86	.26
49	.78	-.19	.45	.25
50	.85	.38	.27	.13
51	.90	-.06	.02	.31
52	.69	.16	.53	.10
53	-.18	.39	.88	.05
54	-.16	-.17	-.12	-.14
55	.29	.21	-.03	.90
56	.37	.54	.68	.20
57	.79	-.07	-.53	.12
58	-.25	.32	.43	-.29
59	.76	.30	.30	-.14
60	.86	.13	.35	-.06
61	.43	.10	.49	.56
62	-.19	.93	.09	.03
63	-.16	-.69	.07	.60
64	.96	-.02	.05	.14
65	.76	-.24	-.02	.51
66	.60	-.20	.07	.66
67	.29	-.18	.54	.54
68	.58	.11	.35	.53
69	-.42	-.04	.72	-.20
70	.38	.28	.09	.07
71	-.24	-.37	.73	.02

Table 13 (cont.)

Subject	Factor I	Factor II	Factor III	Factor IV
72	.51	.06	.67	.48
73	.69	.67	.11	.22
74	.37	.55	.27	.64
75	-.40	.72	.21	.22
76	-.50	.34	.05	.45
77	.56	.68	-.06	.44
78	.48	.20	.74	.27
79	.87	.03	-.34	.09
80	.42	-.43	.26	.64
81	.23	-.14	.84	.35
82	.67	.25	-.20	-.24
83	.37	.81	.21	.08
84	-.15	.44	.68	.43
85	.45	.69	.40	.10
86	.85	.19	.31	.20
87	.24	.00	.28	-.14
88	-.42	-.64	.59	.12
89	.14	.94	-.23	.00
90	.76	.22	.19	.50
91	.11	-.66	.00	.65
92	.91	.22	-.12	.26
93	.59	-.18	.07	.75
94	-.30	-.24	.33	.82
95	.27	.12	.84	-.19
96	.92	.11	.08	.15
97	-.04	.17	.00	.60
98	.71	.16	.27	.26
99	.39	.80	-.02	-.33
100	.21	.67	.46	.09
Eigenvalue	37.78	19.89	14.98	9.02

Table 14

Matrix of Subjects Grouped in Both
Rep 1 and Rep 2
Q-Type Analyses

	Rep 1			
Rep 2	Factor I	Factor II	Factor III	Factor IV
Factor I	28	1	0	1
Factor II	1	0	5	1
Factor III	1	2	1	7
Factor IV	5	8	0	0

Replication Rate = .79%

$\varphi' = .69$ $p < .001$

analyses. This index indicated significant and sizable correspondence ($\varphi' = .69$, $p < .001$).

CHAPTER IV

DISCUSSION

Educators and mental health professionals have frequently noted that learning-disabled children are particularly prone to social and emotional difficulties. Attempts to investigate this notion, however, have yielded contradictory, inconclusive and, occasionally, trivial results. Examination of these studies reveals that virtually all have employed research designs which implicitly assume that learning-disabled children are homogeneous with regard to their personality functioning. The inconclusive nature of the research findings could stem from the inaccuracy of this assumption.

The purpose of the present investigation was to determine if there is any support for the notion that learning-disabled children constitute a heterogeneous population with respect to their personality functioning. A multivariate procedure was employed in an attempt to identify subtypes within a sample of learning-disabled children. More specifically, Q-type factor analytic techniques were applied to a sample of such children about whom a 33 scale personality inventory had been

completed. Further analyses were then conducted to assess the psychometric reliability of the procedures, and to ascertain the degree of separation between the subtypes.

In this chapter, the heterogeneous nature of the personality functioning of the learning-disabled population will be reviewed first. This review will include a summary of the personality patterns characteristic of each subtype. Next, the interpretation to be placed on the negative findings will be discussed. An evaluation of the expectations of the study will follow. Limitations implicit in the methodology employed will be outlined after this. The chapter will conclude with a discussion of the implications of this investigation, including suggestions for further research.

The Heterogeneity of Personality Functioning Among Learning-Disabled Children

Four subtypes emerged from the multivariate analysis of the personality profiles of 100 learning-disabled children. These subtypes, accounting for 77% of the subjects, differed significantly from eachother, and demonstrated adequate psychometric reliability. It appears that there is no single learning-disabled personality type.

In this section, characteristics of the four subtypes will be discussed. Investigators have begun to

examine the diagnostic and descriptive utility of individual PIC scales (Lachar, Butkus & Hryhorczuk, 1978; Lachar & Gdowski, 1979) and of a configural or profile interpretation strategy (DeHorn, Lachar & Gdowski, 1979). However, the art (or science) of PIC interpretation is still at an exploratory stage. Therefore, the following subtype descriptions are offered as tentative and in need of confirmation.

Characteristics in Common. Examination of the validity scales reveals that none of the four mean subtype profiles evidences sufficient distortion to render the profile invalid. As one would expect in a sample of learning-disabled children, all four subtypes evidence at least moderate disturbance in academic and school-related areas. More specifically, each subtype profile suggests: (a) academic achievement below age level; (b) behaviour similar, in many ways, to children with intellectual limitations; (c) atypical intellectual and/or physical development; (d) attributes contraindicative of good adjustment in the classroom; and (e) behaviour similar to that of children found to be learning-disabled.

Of perhaps greater interest is the total absence of other common areas of disturbed functioning. Apparently, the four subtypes of learning-disabled children do not have in common any specific personality characteristics. These results directly contradict the widely held view that one aspect of the learning

disabilities "syndrome" is a particular mode of personality functioning. The personality characteristics describing each subtype will be outlined below.

Subtype 1. The first subtype, comprised of 37 subjects (44% of those assigned to subtypes), represents the most frequently found personality pattern within the learning-disabled sample. Figure 2 presents the mean PIC profile for Subtype 1. Two characteristics of the Subtype 1 profile are particularly noteworthy. Except for scales reflecting academic and school-related functioning, the profile indicates minimal between-scale variation, and a total absence of even moderate scale elevations. The personality profile suggests balanced and well-adjusted social-emotional functioning. These children seem to evidence no more personality problems, on the average, than their normally-achieving peers. Apparently, the school related difficulties of almost half of the learning-disabled children have not adversely affected their personality functioning.

It is interesting to note that the Subtype 1 profile evidences a greater elevation on the Intellectual Screening Scale than any of the other profiles. It could be that, because these children are not distinguishable from normal achievers in terms of their social-emotional functioning, their academic difficulties are

more readily attributed to intellectual deficiences.

Subtype 2. The mean PIC profile of this subtype, representing 20 subjects (26% of those assigned), is presented in Figure 3. These children appear to constitute the most disturbed subtype within the learning-disabled population. They are likely to present as moody, brooding children who display many of the symptoms of childhood depression (lack of energy, anhedonia, crying spells, concern with death and separation, etc.). Their self-esteem is probably low, they are likely more anxious and withdrawn than other learning-disabled children, and they may be shy, fearful and worrisome. Poor interpersonal functioning appears to be another characteristic of this subtype: social (even physical) isolation, peer rejection, interpersonal distrust, emotional distance, and a preference for solitary intellectual pursuits are likely prevalent. It appears that the school-related problems of the children of Subtype 2 are accompanied by a great deal of subjective discomfort and internalized social-emotional difficulties.

Subtype 3. The mean PIC profile of Subtype 3, representing 10 subjects (13% of those assigned), is presented in Figure 4. It is most noteworthy for its indication of marked problems in only one specific area--somatic concern. Subtype 3 children appear to

experience a disproportionate number of visual problems and a variety of somatic complaints. Such symptoms as fainting spells, headaches, dizzy spells, chest pains, and gastrointestinal discomfort are likely to be particularly prevalent among these children. Although they do present academic and school-related problems, the difficulties of Subtype 3 children tend to be perceived as less marked in this sphere than are those of the other learning-disabled children.

Children of this subtype appear to worry excessively about their physical well-being. Their mothers likely express a great deal of distress about their children's difficulties. This raises the possibility that overconcern by both mother and child might be contributing a psychogenic aspect to the somatic complaints.

Subtype 4. The mean PIC profile for Subtype 4, comprised of 13 subjects (17% of those assigned), is presented in Figure 5. The academic problems of these children would appear to be accompanied by considerable behavioural disturbance. They likely demonstrate many characteristics associated with the "hyperkinetic syndrome." In the classroom, they are often perceived as overactive, restless, and highly distractible, and having difficulty maintaining attention and concentration. In general, they are seen as disobedient, disrespectful, unreliable,

and interpersonally insensitive, acting out antisocially and readily expressing their impulses against society. Subtype 4 children would appear to experience little anxiety or internal discomfort. In many ways they resemble children diagnosed as having a "conduct disorder." In summary, despite the absence of preconceived notions regarding the nature of the subtypes which would emerge in the present investigation, the personality patterns of the four identified subtypes are clearly meaningful from a clinical point of view.

Interpretation of Negative Results

The principle negative findings in the present study concern the relationship between the four personality subtypes and nonpersonality variables. No significant between-subtype differences were found with regard to age, sexual composition, Verbal, Performance or Full Scale I.Q., or Reading, Spelling or Arithmetic centile score. Caution is called for in interpreting these negative findings. It would be inaccurate to assume that these results simply contraindicate a relationship between the personality functioning of learning-disabled children and age, sex, IQ or academic achievement.

The nature of the statistical techniques employed to identify subtypes of learning-disabled children has important implications for the interpretation of the apparent lack of relationship between age and personality.

The subtypes were generated via an analysis of personality profile patterns rather than profile elevations. Therefore, the findings with regard to age fail to support the notion of a relationship between age and personality patterns. The possible relationship between age and degree of personality disturbance was not examined. Such an examination would require an analysis of the relationship between age and profile elevation.

The composition of the subject sample did not permit a meaningful investigation of the relationship between personality subtypes and sexual composition. Because only 13% of the subjects were female, between-subtype differences in sexual composition would have had to be extremely large to have reached statistical significance. No females at all (compared to 15% of the males) were assigned to Subtype 3, whereas 58% of the females (compared to 42% of the males) were assigned to Subtype 1. Were this pattern to hold up in a subject sample composed equally of males and females, it could be that between-subtype differences in sexual composition would be significant. Thus, results of the present investigation neither support nor contraindicate the hypothesis that there is a relationship between personality subtypes and sexual composition in the learning-disabled population.

The question is somewhat more complex with regard to IQ and academic achievement. The results fail to support the presence of a simple relationship between

personality subtype and any of the IQ or achievement scores (taken one at a time). However, the possibility of a relationship between personality subtype and the configuration of IQ or achievement scores was not examined. In fact, post hoc analysis supports the notion that there is a significant relationship between personality subtype and configuration of achievement scores. Whereas no more than 30% of the subjects in subtypes 1, 2 or 3 demonstrated average or better skills in any academic area, 62% of those in Subtype 4 were at least average in one or two skill areas ($\chi^2 = 8.21$, $p < .05$). This suggests a relationship between uneven academic functioning and the personality characteristics of Subtype 4. Too few of the subjects demonstrated any specific pattern of uneven academic skills (eg. good reading and spelling with poor arithmetic) to permit an examination of the relationship between personality subtypes and patterns of specific learning deficiencies.

The data does not suggest a relationship between personality subtype and Verbal-Performance IQ discrepancy. However, only 9% of the subject sample demonstrated the Verbal IQ > Performance IQ pattern, as compared to 47% who demonstrated the Verbal IQ < Performance IQ pattern. The relative absence of subjects demonstrating the former pattern precludes a meaningful investigation of possible personality subtype-IQ pattern relationships.

Evaluation of Expectations

Because of the exploratory nature of the present investigation, only two expectations were set forth at the outset.

(1) It was expected that distinct subtypes, differing from eachother with respect to personality functioning, would be identified in the sample of learning-disabled children. Clear support for this expectation was forthcoming: four subtypes were identified, the personality profiles of the subtypes differed significantly from eachother, and each subtype presented a rather distinct and clinically coherent personality profile.

(2) One of the subtypes was expected to demonstrate quite adequate personality functioning. This expectation also found clear support: the profile of the largest subtype identified in this study, Subtype 1, presents a personality pattern indicative of functioning as adequate as one would expect to find in a sample of well-adjusted, normally-achieving children.

Methodological Limitations

The subject selection criteria employed in the present investigation seem to be satisfactory. Approximately 60% of the children referred for neuropsychological assessment were excluded from the sample, mostly because of limited intelligence or primary emotional disturbance.

The subject sample would appear to be representative of the learning-disabled population. However, caution should be exercised in generalizing the results to similar groups of children.

The present study employed subjects within a relatively limited WISC Full Scale IQ range (i.e. 85 to 115). There is no compelling reason to assume that learning-disabled children outside of this range (either particularly bright children, or those with more limited intelligence) would not demonstrate additional and/or very different personality patterns. Therefore, the extent to which the present findings can be generalized should be limited to learning-disabled children within this range of psychometric intelligence.

Two other parameters employed in the subject selection process are relevant in the present context. An attempt was made to eliminate socio-culturally deprived children, and those with primary emotional disturbances, from the subject sample. The identification of such children was based solely on information provided by other professionals and agencies. The reliability of this information was not verified, and the possibility remains that some of the subjects were indeed deprived and/or primarily emotionally disturbed. Nevertheless, a considerable number of potential subjects were excluded from the study due to these criteria. It would,

therefore, be inappropriate to generalize the results of this study to children who evidence socio-cultural deprivation and/or primary emotional disturbance in addition to their learning problems.

The subjects were selected from the population of children referred for neuropsychological assessment because of apparent learning or "perceptual" problems, and the subject sample would appear to adequately represent this population (within the limitations noted above). It is at least possible, however, that children with particularly subtle or atypical learning disabilities might be less readily recognised by referring parties (primarily school personnnel and family physicians). If so, the subject sample would not fully represent the population of learning-disabled children in the school system. This possibility would have been eliminated had subjects been selected by going directly into the school system, administering a screening battery to a large number of unselected children, and identifying the learning-disabled subjects from among this general school population.

Implications

The present study has direct implications regarding past investigations and future research needs. Several observations seem warranted in this regard.

(1) The research design and results of the present

study appear to be unique in the investigation of the personality functioning of learning-disabled children. Cross-validation studies are needed.

(2) The results of this investigation directly contradict the notion that a particular cluster of social-emotional characteristics is descriptive of the learning-disabled population. It seems likely that the inconclusive and contradictory nature of previous research in this area is attributable, to a great extent, to the search for a single learning-disabled personality type. It is hoped that future investigations into the personality functioning of learning-disabled children will take into account the heterogeneity of personality in this population.

(3) There appear to be four subtypes of learning-disabled children that differ from eachother in terms of personality functioning. The largest subtype tends to demonstrate quite adequate social-emotional functioning. The other three subtypes seem to be characterized, respectively by: (a) marked psychological disturbance reflected by internalized social-emotional difficulties; (b) externalized behavioural disturbance reflected by overactivity, distractibility, interpersonal insensitivity, and antisocial behaviour; and (c) a disproportionate pervasiveness and/or intensity of somatic concerns, accompanied by otherwise adequate personality functioning. These personality descriptions were derived from a limited

research base. There is a need to investigate these subtype characteristics in greater depth. Detailed individual psychological assessments of a number of children from each subtype would contribute greatly to our understanding of learning-disabled children.

(4) The apparent relationship between one of the personality subtypes and learning problems of a specific nature (i.e. reading and/or spelling and/or arithmetic deficiency, but not all three) suggests an intriguing line of investigation. It would seem worthwhile to determine whether there is a relationship between patterns of personality functioning and configurations of academic deficits (eg. adequate reading and spelling with poor arithmetic, poor reading and spelling with adequate arithmetic). An investigation of the neuropsychological correlates of the four personality subtypes would appear to offer particular promise.

(5) There is some indication that learning-disabled children who have experienced particularly frequent or serious medical problems might tend to demonstrate similar personality patterns. The possible relationship between personality subtype and medical history (birth trauma, serious illnesses, closed head injuries, etc.) would appear to offer fertile ground for investigation.

(6) Previous investigators have identified certain parental characteristics (Coleman et al., 1958; Goldman &

Barclay, 1974; Owen et al., 1971; Wetter, 1972) and patterns of family interaction (Campbell, 1972; Miller & Westman, 1964, 1966; Peck & Stackhouse, 1973) which appear to be related to the presence of learning disabilities in the children. An investigation of the relationship between the personality subtype of a learning-disabled child and characteristics of his parents and family could prove most informative.

(7) It seems reasonable to assume that the effectiveness of special education depends upon the extent to which both the academic and social-emotional needs of learning-disabled children are considered in the design of remedial programmes. The present study, therefore, is particularly relevant to the education system. Should the results find confirmation in future investigations, it is hoped that educators would take into account personality differences in developing approaches to working with their learning-disabled students.

Correlational Analysis of 33 PIC Scales

	L	F	DEF	ADJ	ACH	IS	DVL	SOM	D	FAM
L	1.00									
F	-.24	1.00								
DEF	.31	-.12	1.00							
ADJ	.52	.43	-.35	1.00						
ACH	-.26	.21	.03	.41	1.00					
IS	-.20	.13	-.04	.20	.61	1.00				
DVL	-.30	.24	-.11	.42	.72	.61	1.00			
SOM	-.01	.66	.08	.01	.01	.06	.03	1.00		
D	-.23	.46	-.03	.59	.37	.18	.24	.33	1.00	
FAM	-.30	.26	-.25	.35	.13	-.01	.02	.09	.23	1.00
DLQ	-.41	.62	-.02	.54	.19	.02	.09	.26	.38	.37
WDL	.01	.45	.10	.29	.31	.08	.17	.36	.71	.08
ANX	-.22	.31	.03	.42	.28	.12	.23	.23	.80	.13
PSY	-.28	.44	-.13	.60	.37	.27	.30	.19	.68	.15
HPR	-.52	.24	-.36	.57	.19	.08	.20	-.16	.07	.12
SSK	-.42	.37	-.30	.77	.36	.20	.33	-.03	.57	.31
AGM	-.63	.55	-.32	.75	.33	.11	.25	.16	.40	.52
AGN	-.48	.40	-.26	.66	.29	.22	.19	.12	.49	.23
ASO	-.58	.64	-.27	.55	.12	.04	.05	.34	.31	.43
CDY	-.13	.02	-.16	.24	.09	.12	.09	-.08	-.08	.02
DP	-.23	.34	-.12	.12	.11	.07	.15	.28	-.03	.49
ES	-.57	.40	-.23	.68	.40	.24	.41	.11	.44	.37
EXC	-.50	.32	-.44	.49	.25	.30	.24	.08	.24	.13
EXT	-.65	.59	-.35	.67	.22	.12	.15	.20	.37	.41
INF	-.02	.59	.02	.16	.03	.15	.21	.56	.26	.08
INT	-.20	.56	.02	.46	.35	.18	.24	.51	.80	.16
I-E	.45	-.20	.30	-.18	.20	.05	.04	.03	.19	-.11
K	.60	-.50	.29	-.52	-.21	-.16	-.12	-.18	-.57	-.43
LDP	-.41	.37	-.37	.42	.50	.37	.49	.24	.30	.38
RDS	-.33	.40	-.30	.52	.35	.12	.23	.18	.44	.21
SR	.32	-.22	.30	-.48	-.22	-.02	-.30	.01	-.22	-.03
SD	.68	-.52	.32	-.81	-.39	-.22	-.36	-.10	-.57	-.51
SM	-.12	.68	.05	.17	.11	.13	.09	.88	.44	.10

Appendix A (cont.)

	DLQ	WDL	ANX	PSY	HPR	SSK	AGM	AGN	ASO	CDY
DLQ	1.00									
WDL	.23	1.00								
ANX	.22	.54	1.00							
PSY	.31	.44	.56	1.00						
HPR	.41	-.17	-.09	.27	1.00					
SSK	.42	.30	.41	.74	.48	1.00				
AGM	.78	.18	.23	.40	.54	.57	1.00			
AGN	.64	.27	.34	.70	.54	.61	.62	1.00		
ASO	.76	.13	.13	.26	.50	.37	.76	.58	1.00	
CDY	-.01	-.17	-.05	.24	.16	.27	.14	.28	.02	1.00
DP	.36	.05	-.08	.00	.12	.08	.36	.12	.44	-.08
ES	.47	.22	.31	.47	.43	.56	.62	.44	.49	.11
EXC	.28	.06	.18	.43	.53	.37	.48	.46	.46	.15
EXT	.73	.16	.18	.46	.65	.54	.78	.78	.90	.16
INF	.19	.32	.28	.24	-.13	.13	.20	.13	.25	.06
INT	.31	.65	.80	.67	.00	.44	.33	.44	.27	.01
I-E	-.33	.34	.28	.04	-.66	-.05	-.32	-.30	-.53	-.10
K	-.61	-.26	-.41	-.53	-.53	-.61	-.64	-.68	-.69	-.10
LDP	.22	.16	.27	.30	.20	.30	.42	.30	.37	.09
RDS	.24	.27	.35	.54	.42	.46	.43	.46	.42	.17
SR	-.19	-.15	-.08	-.28	-.41	-.34	-.34	-.36	-.28	-.20
SD	-.62	-.27	-.45	-.60	-.55	-.78	-.79	-.69	-.70	-.20
SM	.29	.39	.36	.32	-.09	.12	.25	.18	.39	-.04

Appendix A (cont.)

	DP	ES	EXC	EXT	INF	INT	I-E	K	LDP	RDS
DP	1.00									
ES	.30	1.00								
EXC	.08	.42	1.00							
EXT	.36	.60	.57	1.00						
INF	.20	.16	.14	.14	1.00					
INT	.07	.39	.25	.30	.48	1.00				
I-E	-.24	-.22	-.42	-.58	.02	.21	1.00			
K	-.23	-.53	-.53	-.80	-.08	-.44	.41	1.00		
LDP	.21	.56	.54	.44	.20	.31	-.13	-.42	1.00	
RDS	.06	.33	.58	.52	.16	.47	-.17	-.56	.47	1.00
SR	.01	-.23	-.43	-.40	-.02	-.10	.26	.29	-.37	-.29
SD	-.25	-.69	-.51	-.80	-.19	-.45	.31	.80	-.47	-.53
SM	.26	.26	.25	.30	.62	.63	-.03	-.27	.35	.25

	SR	SD	SM
SR	1.00		
SD	.39	1.00	
SM	-.06	-.22	1.00

Item Overlap Among Scales of Reduced Data Set

	F	ACH	IS	SOM	PAM	WDL	SSK	AGM	AGN	ASO	INT	I-E	K	LDP	RDS
F	42	.00	-.03	.10	.03	.09	.00	.06	.09	.17	.19	.00	.00	.02	.06
ACH	0	31	.07	.00	.00	.00	.00	.15	.04	.00	.00	.08	.03	.16	.04
IS	-1	2	34	.00	-.03	-.08	-.03	-.02	.00	.00	.00	.05	.00	.02	.03
SOM	4	0	0	46	.00	.00	.00	.00	.00	.00	.21	.00	.00	.04	.00
PAM	1	0	-1	0	35	.00	.00	.02	.00	.00	.02	.02	-.03	.02	.00
WDL	3	0	-2	0	0	25	.00	.03	.00	.00	.14	.09	.00	-.03	.00
SSK	0	0	-1	0	0	0	30	.05	.00	.00	.05	.11	-.10	.00	.00
AGM	3	6	-1	0	1	1	2	32	-.06	.25	.02	.02	.08	.09	.03
AGN	3	1	0	0	0	0	0	-2	25	.00	.00	-.06	-.11	-.03	.00
ASO	6	1	0	0	0	0	0	10	0	30	.00	-.05	-.03	.00	.00
INT	9	0	0	10	1	5	2	1	0	0	55	.08	-.05	-.02	.08
I-E	0	3	2	0	1	3	4	1	-2	-2	4	47	.06	-.02	.03
K	0	1	0	0	-1	0	-3	3	-3	-1	-2	2	28	-.02	.00
LDP	1	7	1	2	1	-1	0	5	-1	0	-1	-1	-1	61	.10
RDS	2	1	-1	0	0	0	0	1	0	0	3	1	0	4	25

Lower Half = Net Item Overlap (number scored same direction minus number scored opposite direction).

Diagonal = Number of Items in Scale.

Upper Half = Correlation Built In by Item Overlap (calculated using a formula developed by Guilford, 1936).

Appendix C

Item Overlap Among Scales of Data Set Rep 1 and of Data Set Rep 2

Scales of Data Set Rep 1

	F	ACH	SOM	FAM	AGM	ASO	INT	K
F	42	.00	.10	.03	.06	.17	.19	.00
ACH	0	31	.00	.00	.15	.00	.00	.03
SOM	4	0	40	.00	.00	.00	.21	.00
FAM	1	0	0	35	.02	.00	.02	-.03
AGM	3	6	0	1	52	.25	.02	.08
ASO	6	0	0	0	10	30	.00	-.03
INT	9	0	10	1	1	0	55	-.05
K	0	1	0	-1	3	-1	-2	28

Scales of Data Set Rep 2

	DVL	DLQ	ANX	HPR	EXT	INF	SD	SM
DVL	25	.03	.00	-.04	.06	.11	-.06	.00
DLQ	1	47	.05	.05	.17	.00	-.04	-.05
ANX	0	2	30	.00	.00	.00	-.10	.03
HPR	-1	2	0	36	.07	-.05	-.07	.00
EXT	2	8	0	3	46	.00	-.15	-.02
INF	2	0	0	-1	0	13	.00	.04
SD	-2	-2	-4	-3	-7	0	50	.00
SM	0	-2	1	0	-1	1	0	40

Within Each Table:

Lower Half = Net Item Overlap (number scored same direction minus number scored opposite direction).

Diagonal = Number of Items in Scale.

Upper Half = Correlation Built In by Item Overlap (calculated using a formula developed by Guilford, 1936).

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