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THE INTELLECTUAL, NEUROPSYCHOLOGICAL, SOCIAL, AND EMOTIONAL CHARACTERISTICS OF CHILDREN REFERRED BECAUSE OF HYPERACTIVITY

by

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Abstract

THE INTELLECTUAL, NEUROPSYCHOLOGICAL, SOCIAL, AND EMOTIONAL CHARACTERISTICS OF CHILDREN REFERRED BECAUSE OF HYPERACTIVITY

by

Charles J. Spezzano

Adviser: Professor David Ricks

An intensive study of 15 hyperactive boys, age 7 to 10, revealed that these children do not present a uniform diagnostic picture in intellectual, neuropsychological, social or emotional spheres. It is suggested that only a broad interactional model which involves both internal developmental structures and various sources of psychological tension can serve as a framework within which to further explore hyperactivity.

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CHAPTER I

REVIEW OF RELATED LITERATURE

The principal aim of this study was to answer the question: What are the intellectual, emotional, social and neuropsychological characteristics of boys referred by teachers as hyperactive? I shall give by way of preface a review of the earlier work done on the subject, and an assessment of the present state of knowledge regarding hyperactivity in children. The task is a difficult and frustrating one. The term hyperactivity appears in the literature as a synonym for minimal brain dysfunction (MBD), as one symptom of it, and also as a behavior syndrome in its own right, not implying any necessary connection with MBD, and including other symptoms such as distractibility and perseveration under the label "hyperkinetic behavior syndrome." In all three cases, there has been little uniformity of diagnostic criteria among researchers or clinicians. Clements (1966) found 100 different "signs" of MBD in the literature, with hyperactivity as the most frequent characteristic cited. Even when considered as a single symptom there is no accepted instrument or scale with which to measure activity level, so that the group of "hyperactive children" is extremely heterogeneous.

A need for finer subclassification of groups is indicated.

From the clinical viewpoint, however, one of the most pressing demands for the conceptual clarification of the nature of the hyperactive syndrome centers on the unwarranted assumption that the child who is overactive, distractible and emotionally labile is necessarily MBD, and that, therefore, drug therapy is the necessary and sufficient treatment of choice. This assumption appears in the literature over and over again (Levy, 1966; Wender, 1971) with the result that insufficient attention is paid to developing psychotherapeutic and educational techniques for dealing with the hyperactive child. The problem is compounded by the fact that at this time there is no diagnostic procedure accepted by pediatric neurologists as definitive for determining the existence of MBD in a child. The final demand for a reevaluation of the total situation is that the widespread acceptance of amphetamine treatment is based on inconclusive research.

To assist in attaining a realistic overview of the current understanding of hyperactive patterns of behavior in children it will be helpful to have a historical perspective, if only to show how the entire issue became so muddled. Following a review of historical trends, an effort will be made to present an integrated discussion

of hyperactivity including diagnostic criteria, prevalence, etiology, treatment and prognosis.

Historical Trends

As indicated above, although the origins of the pattern of behavior we call "hyperactivity" often are not clear, in many instances the child is diagnosed as having "minimal brain dysfunction" and is treated with one of several classes of medication. I have also posited that both diagnosis and treatment are based on faulty assumptions. It is possible to trace the historical precedent for those assumptions. In 1902, Still described the abnormal behavior of a group of children, a number of whom had lesions in the brain. Although he did not use the term "hyperactivity," the pattern he described would probably be designated as such now.

Postencephalitic Behavior Disorder

This behavior syndrome was again reported among children who showed extreme personality changes after recovering from the 1918 epidemic of encephalitis in the U.S. (Leahy and Sands, 1921; Hohman, 1922; Ebaugh, 1923). Hohman described the "postencephalitic behavior disorder" as involving "profound changes in character and behavior" (pp. 372-73). The children were said to be hyperactive,

distractible, "irritable," "restless," "quarrelsome," and antisocial.

In 1924, Strecker and Ebaugh published a one-year study of 30 children with histories of head injury. Post-traumatic "explosive outbreaks" were found in 15 children. The total disorder was said to resemble the post-encephalitic disorders of children, and not the adult post-traumatic sequence. In 1925, Strecker and Willey treated 14 patients showing a Parkinsonian post-encephalitic syndrome with injections of neutral acriflavine. They reported marked improvement in 3 cases, improvement in 7, and none in 4.

Research in the 1920s seemed mostly to be a reaction to the encephalitis epidemic, and there are no reports of hyperactive behavior patterns in other contexts. In 1929, Kasanin reported a study of the relation of cerebral injury to personality disorders. He found that about 10% of the cases originally diagnosed as psychopathic personalities had serious brain injury during childhood or adolescence, and that in many instances the conduct disorder following the trauma was similar to that found in children following encephalitis. Also in 1929, Hill reported a classic description of the juvenile behavior disorders which followed recovery from epidemic encephalitis. He described the symptom as a loss of inhibition over the

primary emotions resulting in impulsiveness, restlessness, lack of concentration, disobedience. He reported some success in subduing the symptoms with a catalepsy-inducing drug bulbocapnine. Hill's study summarizes the basic achievement of this first decade of research, which was the definition of a pattern of behavior that resulted from some injury to the brain in children, and the initial attempts to find a drug which would subdue the symptoms.

Understanding the Individual Child

The leading researcher in the area in the 1930s was Bond (1931, 1932), who made the first serious efforts at the psychological management of institutionalized post-encephalitic children. After failing to achieve permanent behavior changes with an "attitude of wide tolerance" together with individual psychotherapy, Bond and Smith (1935) attempted to create a "constructive restrictive tolerant environment" (p. 21), in which, for example, children were isolated for impulsive behavior. In many ways Bond's modus operandi resembles recent efforts to employ operant conditioning techniques in reprogramming the social environment of patient populations. This "structured" environment produced the greatest benefit for the children in Bond's hospital school. In the 1931 study improvement in behavior and learning was manifested by

all but 3 of 48 post-encephalitic children and 14 non-encephalitic behavior problems. "At home, 7 out of 20 have taken a second turn in their lives and are reversing the downward direction of behavior after encephalitis." In the 1935 study, of 76 discharged cases, 20 were considered to have recovered the position which they held before the illness.

A classic theoretical paper was published by Kahn and Cohen in 1934. They identified hyperkinesis as the predominating feature of the "organic driveness" syndrome and asserted that restlessness, clumsiness, and explosive motor release of voluntarily inhibited activity are secondary to the hyperkinesis. While viewing organic driveness as a common aftermath of epidemic encephalitis, they emphasized that it also appears in various degenerative diseases of the nervous system, and that constitutional types probably exist also. Most importantly, they felt that it is in accordance with his personality make-up that the hyperkinesis and the "organic driveness" are experienced by the individual and adapted to.

The research of Bond, Kahn and Cohen represented a significant shift in emphasis from the research of the previous decade. In the 1920s the primary preoccupation of investigators had been with the disability, that is, the sensory, motor, and intellectual sequelae of brain

injury. The effect of these impairments on the total personality and adjustment of the disability of the brain-injured child received no attention. In the 1930s, there was increasing emphasis on understanding the personality problems of the brain-injured child rather than focusing on the brain trauma itself as had been the case previously.

Discovery of Stimulants

The advances in understanding that characterized the 1930s seems to have been overshadowed in the following decade by Bradley's (1937) discovery of the paradoxical effect of benzedrine (amphetamine sulphate) on children: although a stimulant for adults, it sedated children with various behavior disorders. It lessened hyperactivity and increased shortened powers of attention. Bradley reported "spectacular improvement in school performance" for 15 of 30 children. While this landmark study has been duly noted in other reviews of the literature (cf. Wender, 1971), Bradley and Green's 1940 study of the psychometric performance of children receiving benzedrine is usually ignored. They reported that test results were not significantly affected and suggested that there may appear to be intellectual improvement in certain situations because the emotional attitude of the individual toward his task has changed. This statement of Bradley's seems to concur with

the opinion of many contemporary critics of drug therapy. Even in those cases where amphetamines do subdue the hyperactive behavior pattern, the quality of the child's resulting state of consciousness is often not "normal" but rather "depressed." Some open classroom teachers have reported that they preferred the child's original over-activity to his "drugged stupor." In any case, Bradley's findings made it clear that mere elimination of flamboyant hyperactivity could deceive an observer into overestimating the range of the child's improvement.

Bradley's research continued along much the same lines as his 1937 study and in 1950 he published an often-cited review of his 12 years of observations on 275 children receiving benzedrine, on 113 receiving dexedrine and on 82 receiving both preparations. The results with either drug were that 50 to 60% of the children became more subdued, 15 to 25% showed no change, 20% showed increased activity, and 5% showed an acceleration of school progress only. Aside from the fact that no control groups were used to protect against placebo effects, there is again the question of what the goals of therapy are. Subdued behavior is an achievement of uncertain merit, when considered alone. Perhaps in some cases suppression of the hyperactivity can make the child more amenable to appropriate psychosocial intervention, but Bradley's studies certainly do not

indicate that drugs should be considered the sole agent of change.

In comparison with the level of research during the 1930s, the research of the 1940s seems to have yielded only minimal progress. Actually, not much else except the discovery of amphetamine therapy was accomplished. Nothing further along the lines of Bond's research in psychological management of the hyperactive child appears in the literature until the 1960s. Also until the last decade, there was little research emphasizing the total personality and individual adjustment pattern of the child or his parents, as had been encouraged by Kahn and Cohen in 1934. Representative Cornelius Gallagher's recent statement on the use of amphetamines represents one view of the attitude that prevailed in the field after Bradley's discovery: Overreliance on drug therapy, he said, may lead to "dependence on quick and inexpensive solutions offered by the new technology without adequate attention being paid to the slower and perhaps more costly methods which would preserve the sanctity of human values and the precious resources of the human spirit" (1970).

After 1950, research seemed to proceed in two separate channels: (1) efforts to establish the organic base of all hyperactive behavior patterns, accompanied by efforts to prove amphetamine therapy the treatment of

choice; and (2) avenues of research which stressed rehabilitation, special education, and treatment of the person as well as the disability. We will examine both mainstreams in the following sections.

Diagnostic Criteria

One can observe thus far in the first three decades of research on hyperactivity the subtle growth of two unjustified assumptions: (1) some set of symptoms such as the hyperkinetic behavior disorder as perforce indicative of brain injury, and (2) amphetamines suppress these symptoms and are therefore the treatment of choice. Over the years further inconclusive evidence was piled on these shaky foundations in an attempt to strengthen this point of view.

Hyperactivity and Brain Damage

With regard to the first assumption, the fact of brain damage in a given child is today impossible to establish conclusively except when one can actually locate the lesion, cyst, etc., or when one knows from the child's history that an injury or disease occurred. The original studies of post-encephalitic children dealt with a population that in fact had brain damage. But as Kaspar and

and Schulman (1972) conclude after a review of the literature on diagnostic instruments for assessing organic damage:

> . . . the relationship between neurological signs and "minimal brain damage" or "hyperkinesis" is not at all clear at present . . . The electroencephalogram has not been shown to be sensitive to brain injury as opposed to psychosocial disorders or mental retardation . . . At present the assumption that brain injury can be diagnosed utilizing the WISC has received no empirical support . . . it is meaningless to discuss the Bender-Gestalt Test as an indicator of brain injury or any other form of pathology without carefully specifying what method of interpreting the test is being used. The Koppitz technique has been successful in statistically separating brain-injured from control groups; however, this has been on the basis that the control groups have produced "good" Benders. Therefore, it cannot be assumed that a "bad" Bender is indicative of brain injury per se. . . . It is clear at this point that there are no diagnostic procedures, psychological or otherwise, which are or should be considered to be definitive instruments to evaluate the presence or absence of brain injury in the child . . . [and] there may never be any (pp. 211-18).

One might then wonder why, in so many cases, the hyperactive child is diagnosed as having "minimal brain dysfunction." The answer is that, as Birch (1964) pointed out, the fact of brain damage and the concept of the brain damaged child have been confused.

The Birth of the MBD Concept

The confusion stems from an extremely influential book by Strauss and Lehtinen (1947) in which they claim that ". . . all brain lesions wherever localized are followed

by a similar kind of disordered behavior" (p. 4). This behavior is characterized by "excessive emotional reactions and hyperactivity" (p. 23). Strauss and Lehtinen introduced the term "minimal brain injury" to describe the behavior pattern. Both the label and the concept still dominate the field. In the most recent survey of the entire topic, Wender (1971) concludes that the diagnosis of MBD can be made on the basis of a detailed history of the child's behavior, and in fact must be, since "the traditional diagnostic measures are of little help" (p. 72).

Thus, the first assumption mentioned above has become widely accepted. Yet the available evidence does not support the existence of a brain-damage behavior syndrome. Bender (1949) observed that some children with acute traumatic or encephalitic disturbances who were cherished in adequate homes showed no subsequent behavior disorders. She offered the explanation that the behavior problems of children with organic brain disorders can usually be explained by social and emotional problems in the life situation. Psychological problems, she asserted, arise due to frustrations from poor relationships with society.

Turning to more empirical research, Schulman et al. (1965) conducted a correlational analysis of test scores

and behavioral ratings of 35 male retarded children. They found "no evidence . . . that hyperactivity is a correlate of brain damage" (p. 103), and concluded that their data did not support the contention that there is a brain damaged child or a brain-damaged behavior syndrome.

Similarly, when Ernhardt et al. (1963) compared the performance of normal and brain injured preschool children, they did not find hyperactivity to be typical of the brain injured children. This study also fails to support Strauss and Lehtinen's contention that there is a stereotype of brain damage or that hyperactivity always follows brain injury. "At present, there is little support for the hypothesis that hyperkinesis is a consequence of brain injury and no support for the hypothesis that it is an inevitable consequence" (Kaspar and Schulman, 1972, p. 209).

How then can one continue to assume that the presence of a hyperactive behavior pattern in a child's history is sufficient evidence of a diagnosis of MBD, as does Wender (1971, pp. 61-75)? There is no support for this simplistic view, and its continued acceptance only serves to inhibit more productive thinking about the question of the hyperactive behavior pattern and its etiology.

Prevalence

While an accurate estimate of the prevalence of the hyperactive behavior pattern depends in large part on how one defines and diagnoses it, some estimates are available. Based on teachers' reports of overactivity and short attention span, Stewart et al. (1966) found the "hyperactive syndrome" in 4% of a population of 5 to 11 year old St. Louis school children. According to Schrag and Divoky (1975): "In 1971, a report from the U.S. Department of Health, Education, and Welfare on stimulant drugs estimated that 3% of the school-age population suffered from moderate or severe hyperkinesis. By 1974, other quasi-official estimates placed the figure at 15 percent" (p. 35). Wiens et al. (1972) report that "hyperactivity" is found in 3 to 5% of grade school children although they do not give a basis for this estimate. Thomas et al. (1969) in a longitudinal study found that complaints about excessive motor activity were reported by the parents of 5% of the Puerto Rican children under 9 years of age (along with reports of symptoms in the areas of discipline, mood and social relationships) and by 4% of a middle class group. But the Puerto Rican figure represented 53% of all presenting complaints while the middle class figure was only 12%. However, Thomas did suggest that: "It is altogether possible that if these [Puerto

Rican] families lived in an environment with more space for physical activities and fewer hazards, the number of complaints about hyperactivity would be greatly diminished" (p. 13). Finally, based on their investigation of drug companies, clinics, and expert testimony, Schrag and Divoky (1975) estimate that between 500,000 and 1,000,000 children are taking amphetamine-type medication (p. 70).

Regardless of our criteria, even conservative estimates of the prevalence of the hyperactive behavior pattern are in the range of 3 to 5%. Since the National Institute of Mental Health estimates the prevalence of moderate to severe emotional problems in school age children to be in the range of 10 to 12% (Engel, 1972), the hyperactive behavior pattern may well account for 25% of all childhood problems requiring clinical intervention. As is true in a number of childhood ailments, the ratio of occurrence of hyperactivity according to sex, shows boys to be more vulnerable than girls.

Many hyperactive children are of normal or superior intelligence, but taken as a group, the research is inconclusive in this area. Some studies claim samples of average intelligence, while others such as Stewart (1974) find that hyperactive children are lower in intelligence than normal classmates, or non-hyperactive siblings. Some have had behavioral problems since infancy, while others

did not appear hyperactive until they entered school. An undetermined proportion manifest problems in fine and gross motor coordination, or identifiable learning disabilities. All this uncertainty and disparity strongly supports the hypothesis that hyperactive children do not constitute a homogeneous group.

Etiology

Many etiologies have been suggested for the hyperactive behavior pattern. We know little about definitive causes. Brain damage has been discussed above. Lacking concrete historical evidence such as encephalitis, or hard neurological signs of brain injury, one cannot conclusively diagnose brain damage, even when one uses the term "minimal." In fact, as Birch (1964) states in his discussion of the use of the term "brain damage":

> Considerable confusion has resulted from the use of this term, since from its first application until the present two problems have persisted: (1) evidence that children exhibiting the behavioral pattern described do in fact have damage to the brain is poor, and (2) many children with known and independently verified brain damage (i.e., non-behavioral neurologic or anatomic evidence) do not exhibit the patterns of behavior presumably characteristic of "brain damage." At the risk of provoking a useless semantic storm, it must be noted that attaching the adjective "minimal" to the term "brain damage," as Pasamanick and Knobloch have done, does not increase the descriptive accuracy of the term or add to either its scientific validity or its usefulness. Regardless of any adjectives, we have the overriding obligation to demonstrate, in terms of

> replicable, valid, and clearly defined criteria, that the multiplicity of aberrant behaviors we now attribute to "minimal brain damage" are in fact, the result of damage to the brain (p. 4).

Genetic Hypotheses

Nor is the evidence conclusive for genetic transmission of the syndrome. There is some evidence which negates the genetic hypothesis. Warren (1971) carried out nuclear sex determinations on 82 males and 14 females under psychiatric care for the "hyperactive child syndrome." Complete karyotype analysis was done on lymphocytes from peripheral blood of 20 males and 3 females. No evidence of sex chromosome aneuploidy or of other chromosome abnormality was found. Warren concluded that a recognizable chromosome abnormality is not a major cause of the "hyperactive child syndrome." Of course, this does not negate a genetic hypothesis. The first line of evidence is family resemblance, and some researchers such as Morrison and Stewart (1971) report that in comparisons of hyperactive and control children, more of the parents of the hyperactive children had been hyperactive as children. Of course, the hyperactivity of the parents has to be determined retrospectively from parental report. The real test will come when we can examine the offspring of today's better documented and defined groups of hyperactive children.

Hyperactivity as an Extreme on the Continuum

The possibility does exist that a predisposition to the hyperactive behavior pattern may be the result of an individual's extreme position on the normal distribution curve for activity level and distractibility. Thomas et al. (1968) found that infants who exhibited extreme characteristics of approach, intensity, activity and distractibility tend to develop problems in these areas later on in childhood. This idea of "constitutional types" deserves further research.

Prematurity

There are some indications (Shirley, 1939; Drillien, 1964) that prematures may be predisposed to developing into hyperactive children, but as Wender (Ibid.) points out: "Such pathology could conceivably be a product of the mother's reaction to a particularly vulnerable child." Further research is needed to separate these factors and to determine if the premature infant is a "high risk" with regard to childhood hyperactivity.

Emotional Problems

Too little research has been done on the hypothesis that many children who exhibit the hyperactive behavior pattern have no brain damage at all, but are emotionally disturbed or are reacting to environmental conditions.

Chess (1960) recognized a reactive pattern of hyperactivity in some children who showed no evidence of brain injury. Cytryn and McKew (1974) suggest hyperactivity as a sign of masked depression in some children. They point out that children have a "tendency to translate affect into action" rather than verbalization.

Alpert, Neubauer and Weil (1959) offer another possible etiology for the hyperactivity manifested by some children. Neubauer presents the case of Tony, in which he relates hyperactivity to an overendowment of the aggressive drive, and suggests that: "With the overflow of aggressive energy into motility, we find an inability to master control" (p. 143). The authors conclude that unusual variations in drive endowment could account for the hyperactivity of some children. Taking a similar position, Mittleman (1957) suggests that hyperactivity could be a product of the inability of certain children to channel anxiety into productive activity. Fenichel (1945) also, although in a much more general reference, states that "agitation in a state of anxiety may be partly due to an attempt to control the anxiety by means of this mechanism" (p. 482).

Field Theory

In addition to representing an attempt to deal with,or an expression of,high levels of anxiety, masked

depression, and overflow of drive energy into the motor apparatus, one can also find in the clinical literature the suggestion that hyperactivity represents a reaction to and defense against the aversive stimuli of academic tasks which are frustrating because of specific learning deficits in the child. Hewett (1973) presents such an argument in the context of Kurt Lewin's field theory:

> . . . Further, in Lewin's view, hyperactivity reflects the blockage of goal-directed behavior by a barrier. An individual who tries in vain to solve a problem may become extremely frustrated and eventually have to give up the goal. One of the effects of the conflict is an increase in restless movements, and children actually observed in such conflictive situations have been shown to increase their activity level markedly.
>
> Lewin's model . . . offers at least a partial explanation of hyperactivity. Since the constellation of problems associated with MBD may seriously interfere with success in school and acceptance by others, a certain degree of the hyperactivity observed in afflicted children in stressful situations may well stem from frustration (p. 41).

Avoidance of Interpersonal Contact

A final hypothesis for the etiology of hyperactivity in some children is suggested by Friedland and Shilkret (1973). They offer the possibility that hyperactivity may be used defensively by children who are afraid of forming relationships with adults "which in the past have led to damage and disappointment. For these children, hyperactivity becomes a means for keeping others at a distance

and fending off the development of relationships" (p. 214).

All of these hypotheses suggest ways of understanding hyperactivity within the psychodynamic matrix of the developing personality. They are, however, unsupported by clinical research with hyperactive children. This study will begin to fill this gap by describing a sample of hyperactive children as whole persons. Such a study will be a first step toward remediating the current status of research in this area as described by Anthony (1973), in which the assumption that some form of brain dysfunction plays the predominant role in determining the behavior of hyperactive children:

> Experience has shown that "organic" patients, once so diagnosed, are frequently separated from the content and process of their minds; even sympathetic, dynamic observers are inclined to approach them exclusively from the "outside," as if the internal sphere was empty or solidified into predictable and stereotyped, concrete slabs of expression . . . At times, they seem to be regarded as no more than check-listed non-entities who would function less erratically, hyperactively, or backwardly if only their brains were treated with a little amphetamine (p. 53).

Treatment and Prognosis

Many therapeutic modalities have been attempted with hyperactive children. They include chemotherapy, individual psychotherapy, behavior modification, educational approaches, parent training and even surgery. None

of these has been shown to produce positive long term results.

Pharmacotherapy

Drug studies overwhelmingly dominate the treatment literature. The use of amphetamines to alleviate behavioral disorders in children was originally advocated by Bradley in 1937. In 1958 (Zimmerman and Burgemeister, 1958) methylphenidate (Ritalin) was first used on children with behavior disorders and eventually became even more popular than the amphetamines. Demand for effective drug therapy to help control unmanageable children in the overcrowded classrooms of the 1950s and 1960s, together with parental demands for action, created "a milieu in which a dependency on the need for effective drug therapy produced many studies which lacked control and scientific validation" (p. 324). The number of these studies is so large that a separate review would be needed to deal with them. Fortunately, three excellent reviews are available, and we will review these reviews.

Sulzbacher (1971) presented a literature review on the topic of behavior modifying drugs. Of more than 1,100 studies which he reviewed, only 210 were considered to have adequate controls. The overall totals for these 210 studies show 106 reporting a significant difference

in hyperactivity after treatment, and 104 reporting no significant difference. Sulzbacher concludes that the widespread acceptance of amphetamines as the treatment of choice for the hyperactive child is based upon inconclusive research.

Messinger (Note 1) reviewed "all studies of clinical efficacy of methylphenidate in children which use a double blind design and placebo control" (p. 1.). He reported on 19 studies conducted in hospitals, institutions and classrooms which dealt with effects of the drug on learning, behavior, intelligence and speech. He found that: "No single test measure utilized in the studies under review consistently shows significant differences between the methylphenidate and placebo groups . . . In summary, the results of tests in the areas of motor performance, perception, behavior and learning do not consistently demonstrate improvement from methylphenidate" (p. 7). He concludes that the drug has not yet been shown to be clinically effective and that: "Side effects, particularly anorexia, weight loss and evaluation of heart rate, are frequent. Toxic psychoses have occurred on the therapeutic doses of methylphenidate" (p. 9).

Finally, Grinspoon and Singer (1973), after reviewing research on the effects of amphetamines on hyperactive children in the classroom, concluded that "there is

no clear evidence that these drugs should be prescribed as often as they are" (p. 515).

On the basis of these findings it would seem that Wender's (1971) conclusion on the treatment of hyperactive children is not justified: "The failure to employ stimulant drugs in MBD children is not a sign of their doubtful therapeutic efficacy but is rather a clear-cut indication of the biases and prejudices of American child psychiatry over the past thirty years" (p. 130). Grinspoon and Singer avoid such premature closure on this issue when they state:

> The behavior taken as a sign of hyperkinesis is real enough. Restless, angry, disturbed, and inattentive students constitute a major problem for many parents and teachers. It also may be true that some elementary school children exhibit this kind of behavior because of organic brain damage or neurohormonal insufficiencies. But it is impossible to believe that the 200,000 or more school children who are now being routinely administered stimulants are all suffering from organic brain damage or deficiencies in crucial CNS chemicals. In other words, there is no justification for the increasingly popular leap from the observation of disruptive or inattentive behavior to the supposition that this is the result of a specific disorder of the central nervous system . . . Symptoms, not causes, have become the focus of treatment, creating a significant potential for abuse (pp. 546-49).

Individual Psychotherapy

Clearly, as far as treatment is concerned, other interventions besides medication should be explored. At this point, there is little evidence, positive or negative,

regarding the efficacy of individual psychotherapy in dealing with the hyperactive behavior pattern. In fact, only one study is available which actually deals with a sample of "hyperkinetic" children. Eisenberg et al. (1961) treated a small series of these children with perphenazine plus psychotherapy, with placebo plus psychotherapy, or with psychotherapy alone. None of the groups did significantly better than untreated controls. In general, the question of the dynamic considerations underlying the hyperactive behavior pattern has been ignored. This lack of research into the possible psychogenetic determinants of the hyperactive behavior pattern seems most logically explained by the widespread acceptance of the notion that the etiology of the syndrome is organic and that medication is the most effective therapy. The realization that neither of these assumptions are based on conclusive research evidence should encourage more productive analytic thinking on the subject.

Behavior Modification and Bodily Self Control

While individual psychodynamic therapy has not been much explored, there is a body of research beginning with Bond in the 1930s that points to the efficacy of changes in the child's environment and behavior modification techniques. In fact, Engel (Note 2) describes some

techniques used by Binet as early as 1911 to deal with children with learning problems. These techniques centered around teaching the child to enjoy self-control of his body. Binet devised a series of exercises to teach children control of motility. Any of these could easily be used with today's hyperactive child. For example, Binet would begin by asking the child to carry a half-filled container of water across the room without spilling any. The water level was gradually increased until the child could carry a full container. This, of course, required that the child move slowly and concentrate on body control. Social reinforcement of success probably played a role in the child's progress. Binet would also play a game with the children where they had to stop and stay perfectly still when he blew a whistle. Thus, he taught his children that low activity levels can be pleasant and rewarding. Another type of exercise which Binet employed was designed to teach these children how to look up, attend, perceive, retain and record. He had them focus on a tapestry and then close their eyes and see what they could remember about its details. Thus, in essence, Binet was dealing with the two major symptoms of the hyperactive behavior pattern: The overactivity and restlessness, and the short attention span. Certainly his methods are deserving of some sound empirical research.

Other "movement activities" similar to Binet's are described by Cratty (1975, pp. 277-81). These include relaxation training, prolonging activities to increase attention span, and practice in slow controlled movement. Cratty cites no research to support these suggestions.

Bond's work with institutionalized hyperactive children is in the same tradition. His "constructive restrictive tolerant environment" improved the behavior and learning of the children in his sample. Other research also seems to indicate that the hyperactive child responds favorably to an environment designed to suit his needs. A basic strategy in controlling hyperactivity has been to reduce the stimulating characteristics of the environment within which the child functions. Strauss and Lehtinen (1950), and Cruickshank et al. (1961) have been prominent in developing and advocating such an approach with hyperactive children. They observe that hyperactivity diminishes and learning is enhanced when a child works in a small booth which reduces to a minimum all extraneous auditory and visual stimuli.

A simple stimulus reduction strategy does not, however, seem to exhaust the possibilities held by manipulation of the stimulus field for the control of hyperactivity. A study by Scott (1970), indicates that the productivity of hyperactive children in an academic setting may be enhanced by the introduction of background music.

Along with manipulation of the stimulus field, indications are strong that proper use of reinforcement contingencies can effect significant behavior change in hyperactive children. A paper by Knowles et al. (1968) illustrates one of a series of case studies of the successful behavior modification of simple hyperkinetic behavior and letter discrimination in a hyperactive child. It demonstrates the efficacy of a special classroom teacher as a "sub-clinician" utilizing the techniques of operant conditioning. Another paper by Novack (1971) indicates that proper teacher training in behavior control techniques will make it possible for many children to learn with a minimum of medication to effect behavior change. He states: ". . . it is increasingly evident that appropriate behavior modification techniques, together with classroom structure, must be readily employed to complement, or where indicated, to replace medication" (p. 508). Novack reports a study by Toffler of 24 hyperactive children who were reinforced for attentiveness to an academic workbook task. The hyperactive children with either normal or abnormal EEGs showed significant decreases in hyperactivity with behavior modification treatment. Thus, it would seem that parents and teachers of hyperactive children should be trained in the proper use of operant conditioning techniques.

"Blowing Off Steam"

Finally, another simple method of reducing hyperactive behavior is available. It is based on the observation by Thomas et al. (1974) that many lower class children who were reported hyperactive lived in environments which provided few opportunities for physical activity. At home because of lack of space, even limited activity was annoying to the parents. The child, in simple terms, had no outlets for his energy. Thomas reports that "one child who had been described by his teachers as 'uncontrollably active' and by his parents as a 'whirling dervish' became much more manageable when the family moved to a private house with a small yard." It may seem a simple observation, but we must keep in mind the notion that not all children in any community or on any socio-economic level have the same need to be active. Yet parents and teachers may overlook this and see "something wrong" with the child who displays a higher than average activity level. As Thomas et al. conclude:

> Certainly, it is highly questionable to label the high activity levels of the Puerto Rican sample as "hyperactivity due to minimal brain damage" thus adding to the loose use of the term in the psychiatric literature . . . It is likely that this high motility did not represent pathological hyperactivity as such but rather the normal temperamental characteristic of high activity level which became exacerbated because of environmental constraints.

Thus, it would seem that another potential solution to the problem of hyperactivity is to allow the child a suitable time and place to be active on a daily basis, to "blow off steam," so that he can sit still when he has to.

Educational Approaches

Can teachers shape a learning environment which will maximize the hyperactive child's chances of success? Cruickshank et al. (1961) arranged a classroom for hyperactive children in which irrelevant stimuli were eliminated or muted while academic materials were made as visually compelling as possible. The academic achievement of subjects in the special class was only minimally better than that of hyperactive subjects in a regular class.

Palkes et al. (1968) trained hyperactive boys to solve academic-type problems. Inhibition of impulsive responses was obtained by having the subjects talk to themselves about what to do. Thus, verbal mediation of behavior may be a promising training technique.

Surgery

This extremely drastic measure has been reported to be successful with young children. Naraghayski et al. (1963) performed amygdalotomies and Balasubramaniam et al. (1970) performed stereotoxic hypothalamotomies on

hyperactive children. They report significant improvement with minimal side effects.

Parent Training

Feighner (1975, pp. 145-55) reports the successful lessening of family tension and problem hyperactivity by using videotape feedback to train parents as behavior modifiers and effective communicators. While she reports only three cases, her methods seem promising because change was accomplished in 3 to 10 sessions.

Postscript on Treatments

It is important to note that the same criticisms that apply to much of the drug research can be applied to studies of other therapeutic modalities: lack of proper controls, too small samples, inadequate follow-up. Another problem of previous research on treating hyperactivity is oversimplification. "Unidimensional programs . . . ignore the full spectrum of psycho-social and biological components of this disorder" (Feighner, 1975, p. 145). We must broaden our perspective.

Prognosis

There is a belief among some clinicians that spontaneous remission of most symptoms of the hyperactive behavior pattern occurs around nine years of age. There is no more conclusive evidence for this than for most

of the other assumptions made about hyperactive children. Further research is needed to support or disprove this hypothesis. In any case, and this is a critical point, in the absence of empirical evidence on the longitudinal course of hyperkinesis we cannot say for sure, even when the overt hyperactive behaviors diminish, that the child has returned to "normal." Some longitudinal studies are in the process of being completed, and the indications seem to be that there are, in fact, negative after-effects marring long term prognosis. One group of researchers (Weiss, Minde, and Werry, 1971) has published its follow-up findings with a subject population of 64 children (60 boys and 4 girls) whose ages ranged from 6 to 13 years at initial referral. They had been diagnosed as hyperactive and had been treated with behavior modifying drugs of various kinds and dosages for varying lengths of time up to several years. At follow-up (four to six years later), although the children's hyperactivity, distractibility, and aggressiveness had diminished somewhat, their behavioral and social adjustment was still significantly impaired. Concentration, emotional immaturity, low self-esteem, and poor social adaptation remained serious problems for many of the children. Also characteristic was academic underachievement despite normal or superior intelligence.

Cantwell (1975, pp. 51-64) reviewed the available research on the natural history and prognosis of hyperactivity. He concluded that hyperactive children are at high risk to develop a wide range of psychiatric and social problems in adolescence and adulthood. Further, he concluded that: "It has not been clearly demonstrated that treatment of any type significantly affects the long-term outcome of the hyperactive child" (p. 63).

Conclusions

It is not an exaggeration to say that after fifty years of research, nothing is conclusively known about the hyperactive behavior pattern. One cannot examine the literature in any depth without being overcome by a burdensome sense of confusion. It is possible, however, to find a way out of this morass.

The Label

First, we will be on firmer ground immediately if we agree on a single label for the hyperactive behavior pattern. It is suggested, therefore, that we call it "the hyperactive behavior pattern." Since so little is known for sure about the etiology of this pattern of behavior, phrases such as "minimal brain dysfunction" only serve to give the appearance of assurance where there is none. All we know at this point is that a pattern of behavior whose

primary manifestation is an overt hyperactivity different in quality, and not just degree, from the physical activity of other children, exists in a large number of school age children.

The Diagnosis

Second, agreement must be reached as to when a child will be classified as exhibiting the hyperactive behavior pattern. In this area, research must be responsive to the current state of affairs in which teachers are the primary source of referrals for hyperactivity. Assuming that they are not adequate observers and sending a team of researchers into the classroom with stopwatches is not a suitable first step, unless we intend to follow the same procedure every time a child is referred as hyperactive. Teachers will continue to be the primary observers of these children and efforts should be made to obtain the proper information from them. This procedure is often followed when a child is referred to a child psychiatry clinic with apparent "psychological" problems but too often in research on hyperactive children the teacher is handed a checklist to interpret on her own, or her simply labelling the child hyperactive is accepted as enough to begin medication. What is being suggested is that the researcher take his basic criteria for the hyperactive behavior pattern, and interview the teacher to

insure that they are talking about the same thing. What should these criteria be? From what has been said before it seems best to remain on a behavioral level, not asking the teacher to make inferences, but rather to describe. Clinical experience suggests that there is at the present time a sizeable population of children who manifest a behavior pattern which includes: (1) spending an inordinate amount of time in purposeless activity, such as walking around the room, getting in and out of one's seat, manipulating books and pencils; (2) inability to sit quietly, without moving body parts and fidgeting excessively; (3) an inability to attend to any one activity for even short periods of time; (4) chattering constantly, or talking to themselves, or interrupting others; (5) is disruptive, and tends to annoy or bother others; (6) teacher feels she is unable to control him and he is unable to control himself; (7) these behaviors are consistently present, and seem to interfere with these children learning up to their potential in school. Any child who meets these criteria clearly could be included in almost any study of hyperactivity in the literature. Whether or not he is also hyperactive at home is a useful piece of information to elicit but the clinical reality is that even if he is not, he should not be excluded from study unless one assumes that hyperactivity must manifest itself equally across

settings. I had the opportunity to observe a boy who met all of the above criteria without question even on Ritalin, and yet could sit still for an hour if his father shouted at him to do so. This did not change the overwhelming severity of his classroom hyperactivity, nor had it prevented his being maintained on Ritalin, despite its questionable efficacy in his case.

Describing the Population

Armed with a strictly behavioral definition of hyperactivity and consistent criteria by which to judge its presence, we can proceed more adequately with our research efforts. A good starting point for such efforts is at the level of descriptive research. Without making any assumptions about etiology, and approaching the child as a whole person, we require a multilevel description of the functioning of hyperactive children, including intellectual, emotional, and neuropsychological factors. Such an investigation would lend considerable support to the clinical viewpoint currently gaining ascendance that there is not just one type of hyperactive child, but rather that the symptom can have many causes.

Treatment

Once the first two steps outlined above have been taken, research into the efficacy of various treatment methodologies should prove more conclusive, if we accept

that a good diagnosis is the best way to begin treatment. To further insure progress, samples should be kept more homogeneous, by excluding children who are not free from chronic medical or gross organic defects, and from orthopedic or special sensory handicap. Such children should be studied separately.

Further studies of the efficacy of drug management and psychological management are needed. With regard to amphetamines, now so widely in use, we need to know much more about their possible adverse effect and long term risks. As for research methodology, studies involving drugs should always use a double blind design and placebo control. In addition, from the clinical standpoint, it would seem that children being treated for hyperactivity should be given a trial with placebo, before the decision to use actual medication is made. A specific question concerning amphetamine therapy has surprisingly remained unanswered and should be immediately settled. Many neurologists believe that the paradoxical effect of amphetamines occurs only with brain damaged children, and that, therefore, if the drug works the diagnosis is organic. However, this is only an opinion. Wender (1971) states: "In attempting to account for the paradoxical effects, it would be useful to know if they are confined to MBD children or if they are characteristic of children in general. Unfortunately, such

data are not available." In light of this lack of data, the following statement by Bakwin and Bakwin (1966) is as unfounded as the neurological opinion given above, although contrary to it: "In contrast to their stimulating effects in adults, the amphetamines lead to subdued behavior in most children."

Even ardent advocates of drug therapy do not claim that it is successful in more than 30% of the hyperactive population. Certainly then, more research is needed on the psychological management of the hyperactive pattern. This research proposal is designed to meet part of that need. But before discussing this specific study, let us suggest some general guidelines. The techniques suggested by Binet in 1911 should certainly be investigated, in conjunction with other behavior modification techniques. Special "structured" classroom using individual booths and music to reduce sources of distraction and relax the child, should be studied. Finally, attempts should be made to determine if some hyperactive children can benefit simply from the opportunity to release pent up energy in daily periods of motor activity which might not be otherwise available, i.e., we should attempt to weed out of the hyperactive category those children whose activity is not qualitatively different from that of "normal" children, but is rather different by degree.

Long Term Studies

Longitudinal studies are needed in the study of hyperactivity as in the study of so many childhood ailments. They provide the only means by which we can answer the core question of how many children really show spontaneous tendency for improvement at age 9, and the question of what problems the hyperactive child carries with him into adolescence and adulthood.

In summary, it must be again asserted that our lack of information in so many crucial areas of this topic demands immediate attention, especially in light of the high prevalence of the hyperactive pattern in our childhood population. There is the obvious need for better and more precisely targeted drugs, for rehabilitative and educative techniques of proven efficacy, and for the study of the total personality of the hyperactivity child so that we may speak intelligently about etiology and prevention. There is a need for a meaningful sub-classification of children who are presently included under the term "minimal brain dysfunction" or the term "the hyperkinetic syndrome." This paper has attempted to delineate three such subgroups: (1) children who are actually brain damaged; it is not enough to label these children--attempts must be made to determine each individual's functional strengths and weaknesses and to institute specific remedial efforts;

(2) children who appear to be hyperactive, but whose activity level is not really qualitatively abnormal; these children often need only an opportunity to engage in some kind of physical activity on a regular basis; they usually do not show all the signs of the hyperactive behavior pattern in sufficient degree to be labeled hyperactive, but may be annoying to parents and teachers; (3) children who actually manifest the hyperactive behavior pattern over a period of time.

Finally, it should be said that given the high prevalence of the hyperactive behavior pattern, our major hope lies in prevention. Preventive efforts may not succeed in every instance, but they offer more hope of eventually eliminating the problem, than all our treatment methods put together. Early identification of high risk children, and increased understanding of both psychosocial and biological determinants are the keys.

CHAPTER II

METHODS

This was not a hypothesis testing study. The aim throughout was descriptive. The method was to comprehensively evaluate a sample of 15 hyperactive children from a multiplicity of viewpoints, and then to present the characteristics of each child that were potentially relevant to his hyperactivity.

The current level of understanding of hyperactivity warranted a case study methodology. Despite the fact that at least one half million children are receiving stimulant medication for their hyperactivity, we have yet to define the characteristics of such children, much beyond the behavioral and gross neurological levels. I felt, therefore, that further exploration was needed.

In the most recent revision of Clinical Psychology, Sundberg and Tyler (1972), make a good case for "clinical exploration." They stress the contributions that have come from researchers who have observed a few individuals closely and in great detail, thereby generating hypotheses to be tried out on a larger number of subjects. They claim that such work, although not a formal research design, falls well within the confines of respected inquiry.

In the Handbook of Clinical Psychology (Wolman, 1965), there is an entire chapter on the case study method, by Bolgar. Again it is stressed that, rather than producing conclusive and widely generalizable results, ideographic studies aim primarily at discovering and generating hypotheses. Also, it is pointed out that much of the knowledge common to all clinicians today was discovered by the case study method. Most important, Bolgar addresses the issue of discovery vs. proof, pointing out that experimentation is mainly concerned with proof and rarely leads to discovery and that in the rigid attention to hypothesis testing, the researcher often overlooks unexpected outcomes which might be discoveries. On the other hand, in her view, there seems to be universal agreement about the fact that the case study method is the ideal way to generate hunches, hypotheses and important discoveries, and is therefore the procedure of choice in an area where little is known for certain.

Subjects

A liaison was arranged at each school. In one case this was the principal, and in the other case a social worker. If a child was referred to them as hyperactive, they would verify that his teacher felt he met all 7 criteria for the study as presented on page 35. Then, they

would also rate the child on their own observations. If both teacher and referring person agreed that the child met all 7 criteria, the author was contacted and supplied with the parents' telephone number. An initial meeting was arranged with the child's parents, during which time the project was explained and the parents' consent obtained for the child's participation. In two cases, the child was directly referred to the Child Psychiatry Clinic of the University of Colorado Medical Center by his parents. In both cases, hyperactivity in school was the chief complaint. The schools were contacted and the criteria for this study were confirmed by the principal and the classroom teacher. One boy (Case 14) was an initial test case evaluated at Montefiore Hospital's Neuropsychology Clinic by the author shortly before the other subjects. The data from that case helped determine the procedures used in subsequent cases. Except for the parent check-list, all procedures outlined in the following section apply to this case as well.

Procedures

During the parent interview, both mother and father were given a Louisville Behavior Checklist (Hiller, 1967) to complete at home. This list of 164 true-false questions yields 18 factor scores, which are labeled: Normal, Irritability, Aggression, Infantile Aggression,

Hyperactivity, Antisocial, Inhibition, Social Withdrawal, Sensitivity, Fear, Learning Disability, Academic Disability, Immaturity, Neurotic Behavior, Psychotic Behavior, Rare Deviancy, Somatic Problems, Sexual Deviance and Prosocial Behaviors. In addition to being given the checklist, the following were the main features of the parent interview: (1) They were asked how they felt about the necessity for the referral and whether they would have sought help for their child if he had not been referred by his school; (2) They were asked about his behavior at home--amount of purposeless activity, activity level (can he sit through a TV program?, go to a department store?), distractibility, talkativeness, disruptiveness, controllability, and impulsivity; (3) The time of onset of the hyperactivity was determined; (4) They were asked about the child's peer relations and relationships with adults; (5) They were asked how they have tried to deal with the problem; (6) The child's past personal history and developmental history were obtained; (7) The interviewer inquired into family structure and home situation, family history of hyperactivity, developmental disorder, neurologic disorder or emotional disorder, and family interaction and relationships.

Next the child was brought in for an interview. The child's appearance and behavior were observed. The

interviewer attempted to tap the child's understanding of his difficulties and to elicit feelings and attitudes about family members and homelife, peers, school and special interests. The child was also asked about worries, fears, unhappiness, and what makes him feel angry. The child was also encouraged to play with items in the room. After about 30 minutes the child was taken to a playroom and encouraged to choose some activities from among the limited selection available which included paper and pencil, crayons, family dolls, a dart gun, animals, soldiers, a doll house, checkers and chess.

When the child next returned to the clinic, testing was begun. In its entirety the testing required two to four sessions for each child. The core testing battery administered to every subject included: the Wechsler Intelligence Scale for Children-Revised (WISC-R) (1974); the Wide Range Achievement Test (WRAT) (Jastak, 1965); the Developmental Test of Visual-Motor Integration (VMI) (Beery and Buktenica, 1967); the Purdue Pegboard Test of Manipulative Dexterity (Science Research Associates, 1948); the Sound-Blending subtest of the Illinois Test of Psycho-linguistic Abilities (Kirk, McCarthy and Kirk, 1968); the Thematic Apperception Test (Murray, 1943); the Rorschach Test (Rorschach, 1942).

Additional procedures were used with specific subjects as follows:

Subject 1:
Raven Colored Matrices
Benton Visual Retention Test
Ayres Southern California Sensory Integration Tests (partial)
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
Test of Concept Utilization (TCU)
Weekly psychotherapy for 9 months
Bushke Memory and Learning Evaluation
Continuous Word Association Test

Subject 2:
Spreen-Benton Aphasia Battery (partial)
Raven's Colored Matrices
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
Test of Concept Utilization (TCU)
ITPA (partial)
Wepman Auditory Discrimination Test

Subject 3:
Bushke Memory and Learning Evaluation
Spreen-Benton Aphasia Battery (partial)
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
ITPA (partial)
Wepman Auditory Discrimination Test

Subject 4:
Spreen-Benton Aphasia Battery (partial)
ITPA (partial)
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation

Subject 5:
Test of Concept Utilization (TCU)
Raven Colored Matrices
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation

Subject 6:
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation

Subject 7:
Benton Test of Visual Retention
Raven Colored Matrices
EEG
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation

Subject 8:
Spreen-Benton Aphasia Battery (partial)
ITPA (partial)
Bushke Memory and Learning Evaluation
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
Wepman Auditory Discrimination Test

Subject 9: Spreen-Benton Aphasia Battery (partial)
ITPA (partial)
Bushke Memory and Learning Evaluation
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
Wepman Auditory Discrimination Test

Subject 10: Bushke Memory and Learning Evaluation
Spreen-Benton Aphasia Battery (partial)
ITPA (partial)
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
Wepman Auditory Discrimination Test

Subject 11: Raven Colored Matrices
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
Benton Test of Visual Retention
EEG

Subject 12: Bushke Memory and Learning Evaluation
Spreen-Benton Aphasia Battery (partial)
ITPA (partial)
Wepman Auditory Discrimination Test
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
Neurological exam
EEG

Subject 13: ITPA (partial)
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation

Subject 14: Bushke Memory and Learning Evaluation
Wepman Auditory Discrimination Test
Gray Oral Reading Test
ITPA (partial)
Spreen-Benton Aphasia Battery (partial)
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
Raven Colored Matrices

Subject 15: Benton Test of Visual Retention
Raven Colored Matrices
Kinsbourne and Warrington Test of Finger Order and Finger Differentiation
EEG

CHAPTER III

RESULTS

In this chapter each of the fifteen hyperactive subjects will be introduced and their intellectual, neuropsychological, social and emotional characteristics will be presented. At the conclusion of each case I will extract the relevant hypotheses that have been generated. My aim throughout is to give the reader a comprehensive and multifaceted view of each boy, sufficient to allow everyone his own conclusions.

Subject 1

Danny was age 8 years,4 months,and in second grade. The seven criteria for the study were really understatements of his behavior disorder. Even during three months on d-amphetamine and Ritalin, his teacher felt he was the most hyperactive boy she had seen in 25 years of teaching experience. His mother was deceased and his father's memory for early history was almost nil. Fortunately, his kindergarten teacher was available for interview. She recalled that he was just 5 years old when he entered kindergarten. From the beginning he had problems with fine and gross motor activities and seemed frustrated by his

deficits. She remembers him also as a "silly little boy" who acted immaturely and had a very short attention span. For these reasons it was recommended that he repeat kindergarten. His parents reacted with anger and disappointment, not believing that he had any real deficits, but rather that he was "goofing off." A few weeks later, his mother drowned. When he returned to school 6 weeks after this, in September, 1972, he had the same kindergarten teacher and she remembers a real difference in his behavior. When faced with the same frustrating tasks, he became much more irritable and often cried. He would engage in much purposeless activity and avoided structured tasks.

In first grade he was tried on stimulant drugs with only minimal effectiveness. He entered occupational therapy to remediate his sensory integration deficits. Despite a year of this training twice a week, his second grade teacher stated that he had very limited reading ability, no math concepts, and that when he wrote his hand shook and he reversed his letters. Socially, he was immature and isolated.

The school was ready to tell the parents he would have to be placed elsewhere, when he was referred to this study.

The evaluation revealed the following:

Intellectual Characteristics

(1) WISC-R:

Information	10	Picture Completion	13
Similarities	15	Picture Arrangement	11
Arithmetic	6	Block Design	8
Vocabulary	10	Object Assembly	8
Comprehension	11	Coding	5
Digit Span	8	Mazes	4
Verbal I.Q.	102	Performance I.Q.	92

Full Scale I.Q. 97

(2) WRAT:

Reading grade 1.6 (Standard Score of 81, 10th percentile)

Spelling grade 1.6 (Standard Score of 81, 10th percentile)

Arithmetic grade 1.2 (Standard Score of 77, 6th percentile)

(3) Gray Oral Reading grade of 1.3 with reasonably good comprehension at the first grade level.

Despite average intelligence, his academic achievement was at about the 10th percentile for his age. His second grade placement already represented one year of retardation resulting from being left back in kindergarten, and his academic skills were developing much too slowly.

In a regular classroom he appeared to stand relatively little chance of developing even minimal academic skills. We felt that he would need almost constant help in going from one step in learning to the next.

The WISC-R subtest scores resembled the pattern reported by Kinsbourne and Warrington (1966) for children

with a developmental Gerstmann syndrome: poor constructional abilities, relative inability to perform mathematical calculations, reading and spelling almost two years below grade level, and difficulty in copying. The other elements of the syndrome are neuropsychological in nature and the discussion of this issue will be picked up again in the next section.

Even without further investigation, Danny does appear to be intellectually disabled in several areas. It is our hypothesis that a certain degree of this boy's hyperactivity results from consistent academic frustration, as suggested by Hewett (1973): ". . . in Lewin's view, hyperactivity reflects the blockage of goal-directed behavior by a barrier" (p. 41). The barrier in this case is the learning disorder and the hyperactivity is a way of avoiding frustrating tasks.

Neuropsychological Characteristics

(1) Visual-Motor Integration Age equivalent = 5.3

(2) Raven Matrices (visual-spatial analysis)--25th percentile

(3) ITPA Sound Blending--within normal limits

(4) Purdue Pegboard: Right hand = 12 (within normal limits)
Left hand = 10 (within normal limits)
Both hands = 8 (Deficit)

(5) Benton Visual Retention Test: Critically deficient.

(6) Ayres Southern California Sensory Integration Tests: Problems with motor planning and bilateral use of upper extremities.

(7) Finger agnosia: 10/20 errors on the right hand
7/20 errors on the left hand

(8) Left-right disorientation

The subject showed a Developmental Gerstmann syndrome (Kinsbourne and Warrington, 1966) with the four classic symptoms:

Finger agnosia
Dyscalculia (WISC-R and WRAT)
Left-right disorientation
Dysgraphia (WRAT and Benton)

The findings of a left-right disorientation and a pronounced deficit in finger recognition complete the picture of a developmental Gerstmann syndrome. While the meaning of the four classic symptoms has been questioned by Benton (1961) I would agree with Gardner (1975), that it is still "justifiable to speak of a Gerstmann, or at least 'Gerstmannesque' syndrome" (p. 242) and that when all the symptoms presented above co-occur, "the chances are extremely high" (p. 243) that there will be pathology in the left parietal (angular gyrus) region.

My real interest, however, was with the behavioral and academic implications of the syndrome. Luria's (1973) description of adult Gerstmann patients is of help here: "However, it remains a characteristic feature of all these cases that intellectual activity remains largely intact: the patients retain their motives; the basic problem is

well retained, the aim of their attempts is still present, and sometimes they may possess a general scheme for the required solution. They experience difficulty only when performing the corresponding operations" (p. 155). In other words, they read the basic problem, but cannot effectively execute the necessary problem-solving operations. If, as Luria (1972) suggests, activity is determined by a specific task and terminated by a specific operation, then, "if the necessary action is not obtained, feed-back signals will reactivate the functional system" (p. 16). Since this boy appears to be impaired in executing the correct specific operation, one can hypothesize continuous reactivation of the self-regulating "dynamic circuits" on which the operations are based. Under such circumstances, we might expect a state of continuously high arousal. Finally, according to Jeanerod (1972), dysfunction in the parietal area leads to poor spatial assumptions, and difficulty is establishing a cortical map or selecting a behavioral goal.

In addition to the possibility that a child so impaired might tend toward chaotic behavior more easily than a normal child, one must also consider the frustration involved and its contribution to his behavioral difficulties. Consistent with Luria's statement that adult Gerstmann patients are usually aware of their defects,

this boy became very frustrated, upset and anxious when he was unable to copy simple geometric designs because he knew his productions were incorrect. This type of frustration and associated "test anxiety" were common experiences for him because of his severe academic deficiencies. As is common with cases of developmental Gerstmann syndrome, arithmetical difficulties were most striking. There also was difficulty both in spelling and printing. Reading was retarded by one year in terms of his current grade placement and two years if compared to his chronological age. The overall academic pattern is consistent with that described by Kinsbourne and Warrington (1966) for Gerstmann children. It seemed highly possible that the accumulated tensions arising from constant academic frustration might well have found expression in hyperactive and disruptive behavior in class. Even if vulnerability to these behavioral reactions existed because of neurologic dysfunction, it seems understandable that they might be maintained and intensified by the school experience.

Social Characteristics

At the time of the evaluation, his father described him as shy, behind in physical development, and disruptive. He saw the subject as "a pest in school who irritates teachers and playmates." After school he stuck pretty close to home and had no friends. His teacher said that

he stood around alone on the school playground, he did things to get others angry and when he did interact with other children he was usually bossy. She further described him as a child who was off in his own world, had no friends, and had a "chip on his shoulder."

Emotional Characteristics

According to the behavior checklist his father rated him at the 97th percentile for hyperactivity; at the 99th percentile for "rare deviancy," a factor which refers to noxious behaviors reported to occur in less than 1% of the general population; and at the 92nd percentile for "fear," a factor which refers to general anxiety and phobic tendencies. This description was consonant with projective testing responses. His Rorschach protocol contained three "shading responses," which, according to Appelbaum (Note 3),"refers to tones of light and dark in achromatic areas when these tones or shades are used as qualities, and not white, gray, black colors" (p. 31). As for interpreting these responses, Appelbaum states: "The basic equation is Ch = anxiety" (p. 32). Given that the mean number of such responses for eight year olds is .92 (Ames et al., 1974), this child's record suggests the presence of more "unbound and intensely experienced anxiety," than the "normal" eight year olds in Ames' study. His record also contains a rare "Clob" response (Ames et al., 1974,

pp. 72-74). On card II he responded, "This is smoke because it's black." Appelbaum would score this C'. He states: "As compared to the Ch anxiety of the unknown and fears, C' black is the knowledge and experience of what is, unfortunately, known" (p. 36). Ames goes one step further in interpreting this type of response: "In the Clob response, the subject's 'core' of personality is shaken, he abandons himself without resistance to strong dysphoric moods. Apparently, according to Piotrowski, thus swayed, the subject would intensify activity, perhaps in a rather uncontrolled manner" (p. 73). Finally, he gave three color (C) responses to only one movement response, an imbalance which, according to Appelbaum, lends itself to three hypotheses: (1) "The person is susceptible to poorly controlled feeling-states"; (2) "The person discharges affect in action"; (3) "Discharge may be taking place somatically" (p. 31).

Before relating this Rorschach analysis to this subject's hyperactivity, we will complete our analysis of his emotional characteristics. Neubauer (1956) suggests that high levels of aggressive energy can overflow directly into motility, producing an inability to master control of one's own behavior. Danny's choice of play activities involved breaking toys, cutting plastic soldiers, and shooting at his mirror image with a dart gun. According

to Santostefano's (1971) assessment model, these choices are presumed to represent action expressions of aggression "involving a high degree of directness, little delay, and relative social inappropriateness" (p. 146). Assuming that action, fantasy, and verbal systems of behaving are the three alternative means to express a drive, Jimmy's play suggested that in his development he had not yet subordinated and integrated action expressions with fantasy and verbal behavior. This was further supported by the fact that his TAT stories showed little evidence that the capacity for fantasy discharge of aggression had developed. Finally, his extremely small number of associations to the word "knife" (Santostefano's Continuous Word Association Test) suggested that the language modality was relatively unavailable as an effective means of expressing aggression.

The source of these angry feelings was not clear. Some possibilities were: (1) his frustration in the learning situation; (2) the exacerbation of this already upsetting situation by his parents' belief that he was an essentially brilliant child who was not applying himself. According to Alpert and Bernstein (1964) such an unrealistic view on the part of the child's parents leads in turn to the child's having an unrealistic view of his own abilities, and make the world seem tremendously frustrating, disappointing and threatening; (3) his parents'

disappointment in him reached a peak when they were told he had to repeat kindergarten. Two weeks later they left him for the first time to go on vacation and his mother drowned. In therapy it became clear that these events were connected in his mind and the memory carried much anger and guilt. And from his kindergarten records it is clear that his hyperactivity was greatly intensified when school resumed the following September.

Conclusion

Possible explanations of this child's hyperactive behavior disorder derive from cognitive, neuropsychological and emotional factors discussed above. Cognitively, it was seen that he was handicapped in the ability to execute problem-solving operations.

Neuropsychologically, we might follow the general line of reasoning proposed by Reitan (1969): "When one considers that various abilities may be reduced selectively, it becomes apparent that the interaction of more and less seriously reduced abilities may constitute a significant influence on behavior in its own right." In other words, the behavior, in some cases, does not stem solely from a dysfunction in a sub-cortical area, such as the reticular activating system, nor from a biochemical deficit, but from a particular pattern of higher cortical disabilities.

There were also several hypotheses related to his emotional characteristics: unbound and intensely experienced anxiety; strong dysphoric moods, the experience of which the subject attempts to defend against by intensifying his activity in an uncontrolled manner; the discharge of affect in action; the inability to handle angry feelings through fantasy and language, and, as a result, discharge of aggressive energy through action or overflow directly into motility, producing an inability to control behavior.

Proceeding on the assumption that this subject's hyperactivity was multiple determined, we began both educational therapy and psychotherapy. Based on available analyses of the developmental Gerstmann syndrome (Kinsbourne and Warrington, 1966; Benjamin, Note 4), remedial reading, spelling, and writing programs were begun. In psychotherapy, as well as traditional therapeutic interventions, some educational work was also done in counting and telling time. Also, within the psychotherapeutic context, further understanding was gained of the relation between his emotional conflicts and his behavior. For example, when therapy began his play was suffused with anality, if viewed within a psychoanalytic context. His play was dominated by bombings, shootings and explosions. For instance, he would mount a cannon on the toilet in the playhouse and kill hordes of attacking soldiers. Also, he

would whirl himself about, fall on the floor and engage in nonsensical speech, behavior which Alpert and Bernstein (1964) label as motoric expressions of anality. These expressions of anger would make him visibly anxious and he would regress to more primitive oral aggression, exemplified by a dragon hand puppet with which he would eat up all the soldiers in the room. What emerged after these expressions of hostility was regression to babyish behavior and much random and purposeless movement. Thus, one could observe within the therapeutic microcosm, a regression from structured expressions of anger to random hyperactivity,as if the anger had indeed begun to overflow into uncontrolled motility.

It was also observed during therapy that his ability to verbalize his depressive affect was inversely related to his hyperactivity. During one session, for example, he was particularly out of control and hyperactive. It was suggested to him that perhaps when he felt very unhappy and upset, it made him feel better to run all around and act silly. He reacted by sitting down and calmly sharing his feelings of inadequacy and inferiority over constant school failure. He remained calm for the remaining 30 minutes of the session and then sat quietly in a crowded waiting room for 15 more minutes until his stepmother came to get him.

He seemed to respond favorably to this overall therapeutic approach, and, by the end of the academic year

in June (after 8 months of treatment) his hyperactivity was no longer considered a problem and he was more attentive to school work. A follow-up WRAT administered at this point yielded a Reading grade of 2.9, a Spelling grade of 2.7, and an Arithmetic grade of 2.6. He was promoted to third grade. At home his mother felt that his ability to control himself had improved radically.

In summary, the following descriptive and etiological hypotheses about hyperactive behavior have been generated by our study of this subject:

1. Hyperactivity is multidetermined. There may be several etiologies in each case.

2. Hyperactivity may be, in part, a response to frustration.

3. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

4. Hyperactivity may be a manifestation of "unbound and intense anxiety" which, according to Appelbaum (1972), is reflected in Rorschach shading responses. This is consonant with Fenichel's (1945) statement that "Agitation in a state of anxiety may be partly due to an attempt to control the anxiety by means of this mechanism. The same holds true for talkativeness" (p. 482).

5. Hyperactivity may be a reaction to and defense against depression.

6. Hyperactivity may represent a susceptibility to poorly controlled feeling states and a tendency to discharge aggressive drive tension and other affects in action.

7. Hyperactivity may be part of a borderline psychotic condition.

The complexity of this case and the large number of pathology-producing variables has been very fruitful in generating new hypotheses for future research. As we examine the other cases, we will attempt to pick out emerging trends and common factors which may serve as guides to new directions in studying hyperactivity. An important principle which merits the most careful attention is the hypothesis of multidetermination, which has been a cornerstone of psychodynamic thinking since Waelder (1936) first elaborated it. Hyperactivity, like other pathological symptoms, may represent the convergence of several etiological factors and may serve more than one function for a given child. This case speaks to the issue of attempting to isolate the causative factor, and suggests that such attempts may not be as fruitful as an interaction approach.

Subject 2

During the initial interview, this boy's parents stated that he was only hyperactive in school, but not at home. Further inquiry revealed that while he did not manifest the whole hyperactive symptom picture at home, he was easily frustrated, he cried often, and he was prone to explosive and unpredictable temper outbursts. What was observable in school, in addition to these behaviors, was the restlessness, impulsivity, fidgeting, and short attention span shown by all the subjects in this study.

At age 7 years, 10 months, Paul was the youngest of seven children. His parents reported that, as the baby of the family, he had been spoiled, and now did not react well to limit setting. His birth was not actually planned, but his mother became pregnant despite the use of a diaphragm. Paul was fine from birth and his parents were both very happy with him. He gained weight easily with no feeding problems or behavior problems. According to his mother, he reached his milestones "early," walking and talking before one year of age. During his preschool years Paul reportedly had a number of friends, both boys and girls. He was well liked by peers.

He entered kindergarten at age four years, six months, and did well at first, really liking school, getting along with his classmates and doing average work. However,

shortly after he entered kindergarten, Paul's mother was hospitalized with a carcinogenic stomach condition. She was away from home for almost a month, and was in critical condition. Paul was not allowed to visit her because of his age. This separation seemed to be very upsetting for him. He would cry at the smallest frustration; wander around without concentration or stand disconsolately by himself; and express fear of the dark, demanding that a light be kept on at night despite the fact that he shared a room with an older brother. In school he seemed "preoccupied, inattentive, hypersensitive to situational changes, and rapidly frustrated," according to his records. Motor unrest was also noted.

After his mother's return home, Paul seemed to settle down again, although he seemed to be even more dependent on her than he had been before. In her words: "He would look for me to baby him--feed him, dress him--things that he could do himself." In school, his observably anxious behaviors diminished from the level they were at during the hospitalization, but there appeared to be a chronic residue of restlessness and overtalkativeness, which continued through first grade.

During the summer of 1974, between first and second grade, Paul's paternal grandfather died. They had been very close and Paul was notably upset. In describing his anxious and despondent reaction to the loss, Paul's mother

reported that he had behaved much the same way a month before the death, when his older brother had joined the Navy. She noted: "He seemed to be afraid that the family would fall apart. He doesn't handle people going away too well." Further, she mentioned that he seemed more phobic in the wake of these losses: "He wanted the light on again at night, and he would cry or hide behind me if he saw a strange dog or if there was a thunderstorm."

Intellectual Characteristics

(1) WISC-R

Information	13	Picture Completion	16
Similarities	9	Picture Arrangement	10
Arithmetic	8	Block Design	18
Vocabulary	10	Object Assembly	9
Comprehension	9	Coding	13
Digit Span	8	Mazes	10
Verbal I.Q.	102	Performance I.Q.	123

Full Scale I.Q. 110

Two separate discrepancies stand out in this profile: (1) the Performance I.Q. is 25 points higher than the Verbal I.Q.; (2) within the Performance scales, the scores range from 9 to 18. As for the first, it would seem that Paul was more proficient on tasks requiring some type of active involvement and manipulation than on tasks which involve verbal skills. While his fund of learned data is above average, as reflected by his score on the Information subtest, Rapaport (1968) points out that, "To

absorb, out of the educational and cultural environment, information or factual data is a much simpler and more direct process than to pick up knowledge of relationships" (p. 87). His capacity for verbal concept formation, on the other hand, is somewhat below average. He gave only one response during the Similarities subtest on what Rapoport describes as "the abstract-conceptual level of concept formation." The other responses were concrete or functional. This finding was supported by his performance on the fifty-item Test of Concept Utilization, where none of his responses were classified as abstract. We hypothesized that Paul's ability to understand the essential nature of problem situations and to see various aspects of these problems in proper relationship was somewhat impaired. Further, his overall verbal skills seemed less than adequate when compared to his proficiency in "acting out" types of tasks. If, as Luria (1966) suggests, voluntary control of behavior is a verbally mediated process, then we can hypothesize that Paul's capacity to conceptualize a given situation and to control his behavior within it was not as strong as it might be.

These hypotheses provided one way of understanding Paul's unusual subtest scatter on the Performance scales of the WISC-R, where Picture Arrangement, Object Assembly and Mazes are significantly lower than the other three subtests. A common factor on these tasks is that no test

samples are put before the subject. He must "see" what the whole is to be by an examination of the parts. More accurately, he must conceptualize and visually anticipate the final product. In Object Assembly, "indications of the parts must be developed into an anticipatory image of the whole" (Rapaport, p. 149). In Picture Arrangement, "the subject's achievement is a reflection of his ability to anticipate the consequences of initial acts or situations, and hence is a reflection of his planning ability" (Rapaport, p. 127). Finally, success on Mazes primarily involves the ability "to visually explore ways to select the most effective action" (Meeker, 1969). Block Design and Coding on the other hand involve reproduction rather than production, and in Picture Completion "the task is explicitly one of concentration" (Rapaport, p. 121). Thus, Paul's Performance subtest scatter supports our hypothesis that his ability to conceptualize the various parts or aspects of a situation is somewhat impaired, and further suggests that a basic component of behavioral control--understanding of the inter-related aspects of one's behavior and one's environment--is not as strong as it might be.

(2) WRAT

Reading grade 2.3 (Standard score of 93, 32nd percentile)

Spelling grade 2.5 (Standard score of 96, 39th percentile)

Arithmetic grade 1.6 (Standard score of 84, 14th percentile)

At the time of testing, Paul was in the second grade and school reports indicated that he was "below average in reading" in his class. At the end of second grade, follow-up indicated that he was felt to be "behind in math also." His WRAT scores seemed consistent with his verbal subtest scores, and this suggested that any deficits in academic achievement were probably related to impairments of verbal intelligence, linguistic abilities, and concept formation as described above.

His ITPA profile indicated an overall psycholinguistic age three months below C.A., well within the average range. But he showed weakness in the auditory area, especially in the ability to relate concepts orally.

Neuropsychological Characteristics

(1) Beery-Buktenica Visual-Motor Age equivalent: 9-4

(2) Purdue Pegboard: (Subject is right handed, eyed and footed)
Right hand = 11 pegs placed
Left hand = 12 pegs placed
Bilateral = 8 pegs placed

(3) Finger Agnosia Test: Right hand 8/20 errors
Left hand 2/20 errors

(4) Sound Blending: Scaled Score = 40 (above average)

(5) Spreen-Benton Aphasia Battery
Naming Test: No errors
Sentence Repetition: Above average
Token Test: One S.D. below mean; mild language comprehension problem

(6) Wepman Auditory Discrimination Test: Within normal limits (one error)

(7) No left-right disorientation observed

(8) Raven's Matrices: Score of 15 is between 25th and 50th percentile

Neuropsychological examination suggested some impairment in left cerebral hemispheric functions. Test results which supported this conclusion included the finding that this right-handed boy was poorer with his right hand than with his left hand on the Purdue Pegboard Test; he had much more difficulty in tactile finger differentiation on his right hand than on his left hand; and he demonstrated some impairment in basic language comprehension. These results were perfectly consistent in implicating the left cerebral hemisphere and would also correlate with the discrepancy between Verbal and Performance I.Q. values.

Contemporary Russian psychologists have proposed developmental theories which might help to explain this child's hyperactivity. Zaporozhets (1957) hypothesizes that the need for direct motor contact with the environment is usually replaced by age 5 with a reliance on thought and visual inspection. Verbal, visual and conceptual deficits can inhibit this transition. This theory is consistent with that of Luria (1966) who stresses the role of verbal mediation in regulating motor output.

Social Characteristics

Paul's peer relations seemed better than other children's in this sample. He was well accepted as a playmate and had built up several stable friendships. His preference for motor activities seemed to be appropriately expressed in play with peers.

Emotional Characteristics

Engel (1972) states: "The assumption is that TAT stories will reveal matters of personal concern--values, fears, aspirations, and preoccupations--that are not entirely conscious" (p. 107). If the assumption has any validity, Paul's fantasy life is preoccupied with anger and death. After a very cautious story within a story on card I, he told eight consecutive stories in which someone dies--killed by a sniper, in an accident, an explosion, a heart attack, shot to death, dynamite, strangulation, and suicide. Initially, he tries to keep these themes at a distance or he constricts his thinking to avoid them. But his defenses quickly give way. However, this apparently intense anger was not evident in his play nor in his verbal associations to the word "knife." His anger is discharged mainly in fantasy, and much energy is expended to contain it. It was felt that this problem might well have interfered with the acquisition and expression of his

neurologically vulnerable verbal and conceptual skills. It was also felt that the conflict left him feeling anxious, uncomfortable and guilty. We hypothesized that his anxiety was being manifested in restlessness, apprehensiveness, and other bodily expressions of anxiety, and impaired attention and concentration.

Conclusion

Paul's hyperactivity was viewed in the context of a cognitive-neurological deficit in verbalization and conceptualization which impaired behavioral self-control, and as a manifestation of an anxious, phobic emotional state. Because his parents refused psychotherapy we were unable to check our hypotheses further.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may be partially determined by a deficit in verbal-conceptual skills necessary for internal verbal control of behavior and for rationalizing one's behavior in complex situations.

2. Hyperactivity may sometimes be a manifestation of anxiety. As Fenichel (1945) points out: "Agitation in a state of anxiety may be partly due to an attempt to control the anxiety by means of this mechanism. The same holds true for talkativeness" (p. 482).

3. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

While case one addressed the issue of a child whose poor cognitive structures resulted in unadaptive and poorly directed behavior, this case describes a child with poorly developed verbal self-control. They may be seen as two examples of a primary cognitive disturbance interacting with emotional conflict and environmental stress to produce a behavioral disorder. Both cases suggest that hyperactivity may be determined by more than one factor in a given child, and they encourage multi-variable research capable of identifying interactions, rather than single-hypothesis studies which imply a common cause and which tend to oversimplify diagnostic and treatment issues.

Subject 3

Unlike the previous case, this child's mother reported that as an infant he had colic and was constantly in motion. She felt he had always been overactive. He was breast fed for three weeks but would spit up and vomit. She then switched him to a bottle "hoping that he would have better luck keeping his food down." Gradually the feeding

problem abated. In describing his behavior in the first few months of life, she says: "He was very active, very demanding and he seemed nervous all the time." He also had and still has several sleeping problems, including needing the light on, thumb sucking, waking up crying, and having nightmares. He appeared to have been accident prone as an infant and toddler, and was hospitalized for burns at 6 months of age and for swallowing floor wax at 18 months.

At age 8 years, 5 months, the subject is the oldest of two children. His younger sister is 5 years old. His parents were divorced when he was five, but he continues to see his father twice a week. His mother, who was 31 years old at the time of the initial interview, was very conflicted about handling both her responsibilities to her children and also meeting her own social needs.

As mentioned above, his behavior problems began in infancy. He was overactive, hard to keep track of, always getting into things he shouldn't. In kindergarten his behavior was characterized by undirected hyperactivity, interrupted at irregular intervals by spells of relative calm. These spells seemed to become less frequent and of shorter duration as he progressed through first and second grade. In his current second grade placement, he is seen as a child who is hypersensitive to stimuli and reacts to situational changes with motor unrest. At home, his mother

reports, he is demanding, impulsive, nervous and babyish. He is constantly on the go, and gets into everything. He engages in nonsensical speech. If taken to a department store, he inevitably gets lost. Even more serious, he likes to play with matches and has set fires on several occasions. He has also stolen money and things outside his home.

Intellectual Characteristics

(1) WISC-R

Information	12	Picture Completion	14
Similarities	12	Picture Arrangement	17
Arithmetic	9	Block Design	16
Vocabulary	11	Object Assembly	16
Comprehension	13	Coding	7
Digit Span	9	Mazes	10
Verbal I.Q.	108	Performance I.Q.	129

Full Scale I.Q. 120

Only three subtest scores are below average in this record--Arithmetic, Digit Span and Coding. One factor necessary for success on these scales is freedom from distractibility. The comparatively low scores may indicate poor concentration caused by anxiety involving the thinking processes. The Guilford factor common to these subtests is Symbols, i.e., they involve the handling of "information in the forms of signs, materials, the elements having no significance in and of themselves, such as letters, numbers, musical notations, and other code elements" (Guilford, 1967,

p. 227). A minor weakness in dealing with symbolic information might be indicated by this subtest pattern.

Overall, though, the most striking discrepancy is between his Verbal and Performance I.Q.'s. This 21 point difference is statistically significant at the 5% level of confidence (Wechsler, 1974). Moreover, if we eliminate the two Verbal subtests which correlate least well with Verbal I.Q. (i.e., Arithmetic and Digit Span) and the two Performance subtests which correlate least well Performance I.Q. (i.e., Coding and Mazes), then all the Verbal subtests are lower than the lowest Performance subtest. On this basis also, we would postulate that there is a meaningful difference between the Verbal and Performance I.Q. values.

(2) WRAT

Reading grade of 3.8 (Standard Score of 106, 66th percentile)

Spelling grade of 3.7 (Standard Score of 105, 63rd percentile)

Arithmetic grade of 3.0 (Standard Score of 97, 42nd percentile)

This second grade boy was achieving above expected levels in all three academic areas. His standard scores are at the level of his Verbal I.Q. rather than his performance score. Since he was 2 weeks too young to enter first grade in 1972 at age 6, he is one of the oldest children in second grade. It is possible that part of the

explanation for his comparatively lower Verbal I.Q. is that verbal tasks are more reactive to educational attainment and he has had a year less formal education than most children in his WISC-R age group who are in third grade. If this is so, his Performance I.Q. might be a better indication of his intellectual potential, and the Verbal-Performance discrepancy might not reflect a neuropsychologically based cognitive imbalance. A possible behavioral implication of this line of reasoning is that he is bored in second grade and therefore restless.

Neuropsychological Characteristics

On the other hand, the 21 point Verbal-Performance disparity might be the result of a dominant hemisphere cerebral dysfunction. But Norman's left-handedness made it difficult to estimate in which hemisphere his speech functions were represented. Based on their use of the sodium amytal technique, Brauch, Miller and Rasmussen (1964) showed that over 60% of normal left-handers have language functions represented in the left hemisphere. So our initial working hypothesis was of some dysfunction in the left hemisphere which impaired the acquisition of verbal skills. The results of our neuropsychological testing were as follows:

(1) Spreen-Benton Aphasia Battery
    Token Test for Language Comprehension--Normal
    Sentence Repetition Test for Imitative Speech--Normal
    Naming Test for Anomia--Normal

(2) Wepman Auditory Discrimination Test--Normal

(3) Purdue Pegboard Test of Manipulative Dexterity
    Right hand--12 pegs placed (Normal)
    Left hand --14 pegs placed (Normal)
    Bilateral --11 pegs placed (Normal)

(4) VMI Age Equivalent = 9-4

(5) Finger Agnosia Test
    Right hand--1/20 errors
    Left hand --3/20 errors

(6) Bushke Memory and Learning Evaluation--Normal

(7) ITPA
    Auditory Reception: Scaled Score = 36 (normal)
    Sound Blending: Scaled Score = 44 (above normal)

The findings do not suggest impairment of sensory or motor functions, and indicate minimal, if any involvement of neuropsychological factors.

Social Characteristics

His mother reports: "Norman's not the easiest kid to get along with. He goes through his friends very quickly." He alienates other children by his constant need to be the center of attention, both parents agreed. His mother added that he is very bossy. In school he was viewed as unpopular, always causing social conflicts, aggressive, and a cheater at games. Combined with his stealing and fire setting, this boy's sociopathic

tendencies were more pronounced than those of any other subject.

Emotional Characteristics

From his early history, Norman resembles what Fries and Woolf (1953) refer to as a "hyperactive Congenital Activity Type." Such a baby is overactive, often colicy, re-establishes homeostatic equilibrium by motor discharge, and tries to master anxiety through bodily movement, restlessness and crying. Such an extreme disposition might be the result of sub-cortical damage, but this must remain a speculation at the current time. The work of Kling and Tucker (1968, pp. 121-145) with neonatal monkeys suggests that hyperactivity which appears shortly after birth involves basal ganglia structures, while that appearing after a quiet infancy involves cortical structures. On the other hand, the work of Buss and Plomin (1975, pp. 183-184) suggests that characteristic level of activity and impulsivity are basic temperaments present at birth, stable throughout life, and possibly inherited. Where a child is high in both temperaments, he will be hyperactive.

Norman's Rorschach record suggests the presence of intense, unbound anxiety manifested in three Ch (shading) responses. The mean number of such responses for 8 year olds is 0.9 (Ames, 1974). This suggests a high level of

free floating anxiety in a child disposed to handling anxiety motorically. Since his initial response to card I ("A grizzly bear--it looks furry") was a shading response, anxiety may be Norman's usual response to new situations. He tries to hold back, to constrict (a 25 second reaction time) but he cannot use the delay to organize a well-structured response. The anxiety appears too overwhelming. Then, his second response to card I is "Two thieves with hats on." On inquiry he explains that "thieves have round hats like that." Perhaps this represents his own impulse toward stealing, and the anxiety and delay may reflect the unsuccessful attempt to defend against the impulse.

On card IV he sees "a monster" after 17 seconds, and on inquiry reports: "It looked furry." Again a Ch response. If this is the "father card," then perhaps his anxiety here is a result of a conflictual father-son relationship. This would be supported by his inability to respond to card 7BM on the TAT, which depicts an older and younger man in conversation; and by his story on 13B which involves a boy who gets lost and is found by new parents who treat him better. All this evidence converges to indicate some discomfort with his parent-child relation. Both Norman and his mother confirm this in conversation. He complains that she is away too much and that at home her entertaining her boyfriends keeps him up late. She

describes herself as very nervous, and says that since the divorce her anxiety has increased over her inability to be a good mother and an active 31 year old woman at the same time.

Conclusion

Here is the classic hyperactive child, in that he was a colicy, overactive infant and now is a problem both at home and in school. The family pediatrician had recommended medication, but mother had refused. She felt he needed counselling.

The problem is how to interpret the infant hyperactivity. This is often taken as a sign of "congenital hyperactivity" and associated with sub-cortical damage. Perhaps it is in this case. But can we assume a necessary and sufficient causal relationship to his current behavior? Kenny et al. (1971) state:

> One may postulate that there are children who are predisposed to hyperactivity because of constitutional factors, who when stressed by environmental vicissitudes beyond their limits of tolerance react with hyperkinesis. The same child, given environmental circumstances which are less stressful, might be able to maintain levels of activity which are generally acceptable (p. 622).

Proceeding on this hypothesis we referred Norman and his mother to a community mental health center in their neighborhood. He received individual therapy and she joined a parent group. In school a simple token system was set

up where he could earn points for appropriate behavior and which he could "cash in" for special activities with his mother. After two months the school reported that his behavior was generally acceptable and his mother said "things are really great at home." It would seem that the intervention had lessened the environmental stresses enough to allow Norman to change his behavior, without medication.

Our study of this boy generated the following hypotheses:

1. A child may be congenitally hyperactive due to high temperamental activity and impulsivity levels or due to dysfunction of cortical or subcortical structures.

2. Hyperactivity may be a manifestation of anxiety.

3. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

In examining our first three cases, a common factor is already emerging. This is the relationship between hyperactivity and anxiety. Fenichel's early allusion to "agitation in a state of anxiety" deserves more attention than it has received in the study of hyperactive children, whereas restlessness and other bodily manifestations of anxiety have been accepted for some time as indicative of

an anxiety state in adults. We will be alert to this factor in the remaining cases and in future research.

Subject 4

Sam was originally evaluated for hyperactivity at a local mental health center when he was seven years old. He was put on Dextroamphetamine, 5 mg. twice daily. Both parents and school confirmed a marked improvement in Sam's performance and behavior.

However, four months later the prescribing physician got a call from Sam's mother, that he was becoming hyperactive again. This was also observed by Sam's teacher. Since this change in behavior coincided with the family moving to a different home and the birth of a baby brother, the physician's first attempt was to encourage school and mother to wait to see if a spontaneous readjustment would occur as Sam got used to his new situation. This did not occur and the complaints increased. The Dexedrine was increased with no benefit. Several family sessions were held during which a direct correlation was established between talking about anxiety provoking topics, such as the birth of the baby and parents fighting, and Sam's becoming hyperactive in the sessions. More important, it was observed that when this was pointed out to Sam and he was restrained, he became notably depressed and revealed many

thoughts of low self-esteem. He felt his family "would be happier if I weren't around at all" and that "it would be better if I were dead." Family therapy was started but when the focus turned to the marital conflict the parents withdrew.

It was almost two years later when Sam was referred to this study. He was 9 years, 8 months, of age. Both parents and school felt unable to cope with his hyperactivity and increasing angry outbursts and fist-fights.

Intellectual Characteristics

(1) WISC-R

Information	8	Picture Completion	14
Similarities	12	Picture Arrangement	13
Arithmetic	7	Block Design	11
Vocabulary	9	Object Assembly	14
Comprehension	12	Coding	10
Digit Span	6	Mazes	8
Verbal I.Q.	97	Performance I.Q.	117

Full Scale I.Q. 106

Language functions are significantly weaker than visual-spatial functions. As early as 1949, Pavlov recognized that language is "the highest regulator of human behavior" (cited in Goinotti, 1972, p. 79). Thus, for Sam, as for several boys in this study, one basic behavioral control structure is not as strong as it might be. Also, academic tasks dependent on verbal-conceptual skills, including arithmetic may be difficult and frustrating.

(2) WRAT

Reading grade 3.3 (Standard score of 88, 21st percentile)

Spelling grade 2.6 (Standard score of 82, 12th percentile)

Arithmetic grade 3.0 (Standard score of 85, 16th percentile)

Sam is in third grade, so it would seem that his academic achievement has not suffered severely from his behavior problems. However, his WRAT scores are lower than one would expect on the basis of his WISC and his actual classroom performance was considerably poorer than his WISC or WRAT scores suggest.

Neuropsychological Characteristics

(1) VMI age equivalent = 9-4

(2) Purdue Pegboard
Right hand --12 pegs placed
Left hand --12 pegs placed
Bilateral --11 pegs placed

(3) Finger Agnosia
Right hand --2/20 errors
Left hand --0/20 errors

(4) Spreen Benton Aphasia Battery
Language comprehension -- 0.6 SD below mean
Imitative speech--Average
Word Finding--No anomia

(5) ITPA
Sound Blending--Scaled score = 40 (+0.7SD)
Manual Expression--Scaled score = 38 (+0.3SD)
Verbal Expression--Scaled score = 35 (-0.2SD)

In a right-handed, right-eyed and right-footed boy, we would expect a better Purdue Pegboard performance with

the right hand. Sam does equally well with his left hand and his tactile discrimination is better on his left side. This suggests mild left hemispheric inferiority in functioning, and is consonant with the WISC-R disparity, which indicated that left hemisphere mediated language skills were weaker than visual-spatial functions. Further evidence of this relative weakness is the mild language comprehension deficit, and the lower score on Verbal Expression as compared to Manual Expression on the ITPA. Sam can express his ideas through movement better than with spoken words.

Social Characteristics

His mother reports that Sam's peer relations are characterized by jealousy and fighting. She sometimes finds his cruelty to animals or people shocking and sadistic. He bullies and frightens other children.

Emotional Characteristics

Sam's mother was divorced shortly after his birth. He slept with her until age 2-1/2. Then she remarried and he was notably jealous. He was not completely toilet trained until age 5, when his mother began to spank him every time he wet or soiled.

On the WISC-R, his low scores on Arithmetic and Digit Span suggested impaired attention and concentration.

Together with the fact that Coding was the lowest of the five main Performance subtests, these scores raise the question of anxiety or depression. Further indications of depression from the Rorschach were: (1) only 12 responses; (2) one failure; (3) no movement responses; (4) only one color response; (5) two C' (black) responses in a short record; (6) F% = 92; (7) F+% = 50; (8) elongated reaction times (15 second average). His one color response was a pure C. This suggests a tendency toward affective discharge of drive tension.

His TAT themes are mostly concerned with deprivation and sadness. The stories are short and constricted with little or no action, except for a stabbing and an attempted murder. The majority of his "stories" are descriptions of sad, sick and lonely children.

Conclusion

This is essentially an anxious, depressed boy with at least tangential evidence from his Rorschach of a tendency toward affective discharge of drive tension. Concerning the latter, Schachtel (1966) suggests: "Drive tension can be discharged not only in affect discharge but also in motor activity. The two may go together, as in expressive movements or in an affect-fraught action such as an angry physical assault, but they may also occur separately. In the sphere of motor behavior, the parallel

to being passively overwhelmed by an affect (as in a pure C response) may be seen in such activities as physical restlessness resulting from drive tension, or impulsive acting out . . .;" Sam showed both. His relatively weak language functions may have increased his difficulty by precluding verbally mediated self-control.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may be a form of masked depression. As such, it is an attempt to ward off the pain and anxiety associated with a depressed state.

2. Hyperactivity may represent a discharge of drive tension.

3. Hyperactivity may be partially determined by a deficit in verbal-conceptual skills necessary for internal verbal control of behavior and for rationalizing one's behavior in complex situations.

4. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

This case supports the theory that hyperactivity and acting out behavior may both be components of childhood depression. Malmquist (1972) states: "This may be

an equivalent of the hypomanic behavior seen in adult patients in an attempt to ward off depressive feelings, although it may all too often be passed off as a symptom of 'brain damage' in children." Depression may occur more frequently in latency age children than is usually realized.

The interaction of cognitive and affective factors is also suggested here. When cognitive regulators of behavior are weak, there may be a tendency to discharge drive tension in motor behavior, rather than in fantasy or language.

Subject 5

Edward was the fourth of five pregnancies for his mother. He was the product of a normal pregnancy and delivery. Developmental milestones were within normal limits. Consistent sleeping problems were reported by his mother. Until 12 months he would wake up crying and rarely slept through the night. From 36 to 48 months he reported nightmares, the content of which neither mother nor Edward could recall. Sleep walking was noted from 60 to 72 months. He still refuses to sleep alone.

When asked to relate any events in Edward's life which caused special stress, his mother reported: "His father has been ill twice for a span of 5 to 6 months in

Edward's lifetime. Various diangoses of his illness indicate the cause is unknown. Our financial status doesn't allow us to buy the things Edward or the other children want. Presently I am undergoing emotional problems and I'm receiving counselling and medication for depression and anxiety."

Behaviorally, she feels he has been hyperactive since he was a toddler. At 10 he still can't watch TV without becoming fidgety and restless. He cannot go to a supermarket or department store without getting lost or becoming disruptive. She feels he is clumsy and uncoordinated. He is unpopular with peers, but she also feels he is overly sensitive and sometimes "imagines" he's being picked on or laughed at or talked about when he's not. At home, both parents feel he whines and complains too much. He manifests nervous habits such as biting his fingernails, twisting his hands and pulling his hair. He is afraid of being alone and demands to have someone to sleep with.

Intellectual Characteristics

(1) WISC-R

Information	9	Picture Completion	10
Similarities	15	Picture Arrangement	11
Arithmetic	6	Block Design	8
Vocabulary	12	Object Assembly	11
Comprehension	10	Coding	9
Digit Span	11	Mazes	8
Verbal I.Q.	102	Performance I.Q.	98

Full Scale I.Q. 100

Edward's overall intellectual functioning was in the Average Range. The Verbal-Performance discrepancy is not remarkable. The low score on Arithmetic may indicate poor concentration caused by anxiety. The high Similarities score may suggest that Edward prefers fantasy abstractions to the reality based "here-and-now" tasks which make up much of school work. Performance scale subtest scatter is not so striking and seems to reflect generally average abilities in visual-spatial perception and visual-motor coordination.

(2) WRAT

Reading grade 6.7 (Standard Score of 114, 82nd percentile)

Spelling grade 5.5 (Standard Score of 104, 61st percentile)

Arithmetic grade 3.6 (Standard Score of 88, 21st percentile)

There is remarkable variation in school achievement for this fourth grade boy. The low arithmetic score is consistent with his performance on the WISC and may suggest either a specific learning disability or the effects of anxiety on concentration, or both. Overall, though, learning efficiency seems strikingly unaffected by the severe behavior problems.

Neuropsychological Characteristics

(1) Visual-Motor Age equivalent = 7.4

(2) Purdue Pegboard
Right hand--12 pegs placed (1.9 SD's below mean)
Left hand --11 pegs placed (1.6 SD's below mean)
Bilateral -- 9 pegs placed (1.8 SD's below mean)

(3) Raven's Matrices = 50th percentile

(4) Finger Agnosia Test
Right hand--2/20 errors
Left hand --2/20 errors

(5) Sound Blending--Scaled Score = 44 (above average)

Edward's VMI age equivalent and his poor performance on the Purdue Pegboard suggest an impairment in fine motor skills, with no indication that either cerebral hemisphere is relatively more involved. When these scores are combined with his WISC-R scores there is little support for the hypothesis of any significant neurological dysfunction.

Social Characteristics

Edward himself reports that he has no friends and that he is the only child who always eats alone in school. His mother says he quickly alienates other children because he is impulsive, nervous, clumsy, over-talkative, has staring spells, swears and curses inappropriately and is bossy. His teacher's report is consistent with mother's.

Emotional Characteristics

Edward was silly, noisy and babyish during testing. At times, he would suddenly begin to sing or make noises

or clap his hands. His projective test responses were strongly suggestive of psychotic tendencies in his personality. The Rorschach summary revealed a high F% combined with an F+% of 28, whereas the mean F+% for 10 year olds is 89. Rapaport (1968, p. 348) considers this a sign of schizophrenia. There are six confabulations in a record of 20 responses. According to Rapaport (1968): "These responses always imply the probable presence of unrealistic, autistic thinking in everyday situations, where fantasies and autism replace adherence to objective orientation to reality" (p. 435). Such excessive fantasy in the record of a normally intelligent 10 year old suggests that this is a very disturbed child. A few samples from his protocol demonstrate the severity:

> Card I, response I: "A big ole mess. (Inquiry) There's blood all over because Jesse James shot some guy with a machine gun."
>
> Card III, #1: "Blood" (?) "It's red."
> #2: "A big ole black monster with claws and sharp teeth. He just ate somebody--that's where the blood came from."
>
> Card VIII, #2: "Two lions ripping a woman apart."

His responses to the TAT were similar: a boy punching his crippled father; a woman who breaks her arms and legs because she fell when an ant bit her. He showed more and more bizarre thinking as he proceeded, and in his last few stories he lost almost all contact with the cards themselves.

Conclusion

In his behavior and in his test responses Edward gave ample evidence of intense anxiety, lack of control over his affects, and unrealistic, autistic thinking. His hyperactivity is most parsimoniously viewed as a manifestation of a severe emotional disturbance. Chlorpromazine was helpful in reducing the acute anxiety, while stimulants exacerbated his behavioral disorder. He is being maintained on chlorpromazine and is in intensive psychotherapy.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may be part of a borderline-psychotic or psychotic condition. As such it represents the overwhelming of the ego by anxiety and the loss of behavioral control, whereas in hypothesis 4* hyperactivity may be a last ditch effort to control anxiety.

2. A child may be congenitally hyperactive due to high temperamental activity and impulsivity levels or due to dysfunction of cortical or subcortical structures.

Like Case #4, this case seems to represent a primary emotional disturbance with hyperactivity as the predominant observable symptom. The presence of each two such cases in a sample of 15 would suggest that projective testing, psychiatric interview or other means of assessing

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*See Hypothesis 4, p. 158.

personality disorders be included in the evaluation of hyperactive children.

From these first five cases emerges the concept of a multiplicity of factors, cognitive, emotional and neuropsychological, centered in the child and in his environment, which explain more effectively than any single variable the adaptive accommodation of the child which we have been classifying as hyperactive.

Subject 6

Peter had a history of high activity levels since birth. His mother found him to be a difficult baby and by his preschool years she couldn't bear to have him home all day. He still cannot sit long enough to watch a half-hour TV program. She never takes him to a supermarket or department store. In school he has always been both a good student academically and a severe behavior problem. He had a special desk next to his teacher's desk in fourth grade.

He was the product of a normal pregnancy and delivery. Sleeping problems persisted to age 6. At age 9 years, 10 months, he still has occasional problems with bladder control. Peter says he forgets. Developmental milestones were not remembered well by this divorced

mother, but there is still difficulty tying shoelaces and cutting meat.

Intellectual Characteristics

(1) WISC-R

Information	14	Picture Completion	16
Similarities	14	Picture Arrangement	13
Arithmetic	11	Block Design	14
Vocabulary	14	Object Assembly	18
Comprehension	13	Coding	9
Digit Span	12	Mazes	12
Verbal I.Q.	120	Performance I.Q.	129

Full Scale I.Q. 127

Peter's intellectual functioning was close to the Very Superior range overall. On the Verbal side his mean subtest score for all six tests was 13. Only Digit Span and Arithmetic were below this level, suggesting possible impairment of attention and concentration. On the Performance scales, there was considerable scatter. Coding was significantly lower than other scores, and combined with Digit Span and Arithmetic may be indicative of interference from anxiety. This could also explain the wide Performance scale scatter, but diagnostic clarity depends on findings from other tests.

(2) WRAT

Reading grade 7.5 (Standard Score of 125, 95th percentile)

Spelling grade 6.5 (Standard Score of 116, 86th percentile)

Arithmetic grade 4.7 (Standard Score of 100, 50th percentile)

As his fourth grade teacher reported, he has average or above average in all academic areas.

Neuropsychological Characteristics

(1) VMI Age equivalent = 12-8

(2) Finger Agnosia
Right hand--0/20 errors
Left hand --1/20 errors

(3) Purdue Pegboard
Right hand--14 pegs placed (Average)
Left hand --13 pegs placed (Average)
Bilateral -- 8 pegs placed (2.5 SD's below mean)

(4) Sound Blending = Scaled Score of 44 (above average)

The only impairment noted involved bilateral manipulative dexterity as measured by the Purdue Pegboard. This is consistent with his inability to tie his shoes. According to Luria's investigations (Christensen, 1975), in adults this is one sign of a possible parasagittal lesion affecting the anterior divisions of the corpus callosum. However, in a child of thisage it may signify a developmental neuropsychological delay.

Social Characteristics

Peter's mother and teacher reported that he got along well with other children and had several close friends.

Emotional Characteristics

The presence of six shading responses in his Rorschach record suggests a high level of anxiety, and the fact that the anxiety is often unbound and intensely experienced. Combined with one pure C and two poor-quality FC' responses, the high picture is one of much affective and anxious tension, which probably leaves Peter feeling uncomfortable much of the time.

His TAT contains many flat, restricted stories, with three murder stories scattered in between. One is left with the impression of intense angry feelings which do not get expressed directly in behavior, but which are constantly present. He must struggle to contain these feelings with the resulting unrest and discomfort displayed more clearly on the Rorschach.

Conclusion

Peter's hyperactivity can be understood as a motor manifestation of anxiety and tension, possibly related to a struggle against experiencing anger. In addition, this seems to be a case where motor hyperactivity existed since birth and caused considerable tension in the mother-child relationship. Peter's mother was especially intolerant of his being temperamentally active and impulsive. Arieti (1967) suggests: "A mother who is not able to

accept the child's hyperactivity makes him anxious, and his anxiety expresses itself in increased restlessness and disorganized patterns of motor behavior" (p. 314). Peter was extremely frustrated and upset by his inability to sit still and felt that he kept getting in his mother's way with negative results.

In an attempt to break this feedback cycle between mother and child, stimulant medication was suggested on a temporary basis. A pediatric neurologist who had earlier suggested stimulants, despite a normal EEG, was contacted and he began Peter on Ritalin. In a conversation with Peter a few weeks later, he commented that he felt much happier with his medicine and asked for it on weekends too.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may be a manifestation of anxiety expressing itself in restlessness and disorganized patterns of motor behavior.

2. A child may be congenitally hyperactive due to high temperamental activity and impulsivity levels or due to dysfunction of cortical or subcortical structures.

This case brings into focus the problems of the child who, from birth, does not have the expected degree of control over his level of activity. Peter was a

"difficult child" in the temperamental classification of Thomas et al. (1970). Unfortunately his parents were unable to cope with his temperament and foster healthy development. Their impatience and punitiveness exacerbated the problem.

The source of such temperamental peculiarities is not clear. Satterfield (1975) suggests that hyperactive children who respond well to Ritalin show an abnormally low level of physiological arousal (a function of the reticular and thalamic systems) which he hypothesizes is associated with lack of motor inhibition at the subcortical level. This may prove to be one determiner of temperament. But this case and the work of Thomas et al. suggests that temperament is only a predisposition. Not all "difficult" babies become behavior problems in school. In Peter's case his temperamental problems were exacerbated in a parent-child conflict. This resulted in such a high level of anxiety that he could not maintain adequate control over his motor behavior and was in a constant state of agitation.

Subject 7

Ted was a very active and colicy infant with severe feeding problems. As a preschooler, when his mother read stories to a group of children she babysat for, he was

the only one who would not sit and listen. He was motorically precocious and rode a two wheel bicycle at age 3. He still cannot be taken to a supermarket or department store.

His parents separated when he was just 9 years old. He is now age 10 years, 4 months, and lives with his mother and 8 year old sister. His father lives nearby and there is frequent contact. While Ted has always been restless, his behavior problems increased in third and fourth grade.

Intellectual Characteristics

(1) WISC-R

Information	9	Picture Completion	6
Similarities	11	Picture Arrangement	6
Arithmetic	14	Block Design	13
Vocabulary	10	Object Assembly	11
Comprehension	8	Coding	4
Digit Span	11	Mazes	6
Verbal I.Q.	102	Performance I.Q.	87

Full Scale I.Q. 93

The Full Scale I.Q. is relatively low for this sample. But the Verbal-Performance disparity and considerable subtest scatter makes it obvious that the Full Scale I.Q. does not reflect this boy's assets or deficits, but is simply a statistical averaging of abilities. On the Verbal side, the low Comprehension score calls into question Ted's relative ability to problem solve in social situations, and his ability to work out or appreciate the

common sense reason for a situation. Combined with his score on Picture Arrangement we must question not only his judgment but also his ability "to anticipate the consequences of initial acts or situations" (Rapaport, 1970).

The low score on Picture Completion suggests an impairment in visual concentration as opposed to good general concentration which is reflected in a high Arithmetic score. The low Coding score might represent the same problem, but might also suggest severe depression. In fact, the entire profile would not be inconsistent with a diagnosis of depression, especially the significantly lower Performance I.Q.

(2) WRAT

Reading grade 5.7 (Standard Score of 106, 66th percentile)

Spelling grade 4.2 (Standard Score of 93, 32nd percentile)

Arithmetic grade 5.9 (Standard Score of 108, 70th percentile)

(3) Gray Oral Reading Test

Grade equivalent = 3.7
Comprehension = grade 3 level

The difference between word recognition as measured by the WRAT and paragraph reading on the Gray Oral is striking. Reading speed and comprehension are well behind the level of sight vocabulary. This suggests that passive reception and memorization are taking place but that

understanding and active concentration are inefficient. In one story he skipped an entire line and a half of print, raising the question of a visual processing problem.

Neuropsychological Characteristics

(1) VMI Age equivalent = 11-9

(2) Raven's Matrices = 95th percentile

(3) Purdue Pegboard
Right hand--12 pegs placed (1.8 SD's below mean)
Left hand --10 pegs placed (2.2 SD's below mean)
Bilateral -- 9 pegs placed (1.8 SD's below mean)

(4) Benton Test of Visual Retention (10 second exposure with immediate reproduction from memory)
Correct = 6 These scores indicate average to
Errors = 6 above average visual memory skills.

(5) Finger Agnosia
Right hand--1/20 errors
Left hand --1/20 errors

(6) EEG: 100% asymptomatic

(7) Pediatric Neurological: 100% asymptomatic

(8) Sound Blending: Scale Score of 40 (above average)

Visuo-spatial perception, visual-motor coordination and visual memory are all intact. Manipulative dexterity is moderately to severely impaired. This might be neurologically based, although given other data it seems more likely to reflect retardation of psychomotor speed.

Social Characteristics

Ted does not relate well to other children. He is bossy with parents and peers. He is constantly fighting.

His father, who coaches a hockey team Ted plays on, says he is often withdrawn and unresponsive. Sometimes he bullies other children. Often he seems tired, and tends to lie around, showing little interest in doing anything. His father feels he's depressed.

Emotional Characteristics

Several features of his Rorschach record suggest depression: (1) a short record; (2) F% = 100; (3) no movement; (4) no use of color except to identify the separate parts of the blot (e.g., The pink are the cheeks); (5) 33% Popular responses; (6) generally elongated reaction times. The almost complete restriction of responses to gross W's and the very low F+% are diagnostic of anxiety accompanying the depression. They indicate that the reduced responsiveness associated with the depressive features is dominated by an anxious quality, and that he is restricted to gross, often inaccurate perceptions and judgments.

His TAT record supports this picture. Two stories (6BM and 7BM) are little beyond descriptions of each picture, perhaps suggesting repression of feelings about both parents of the divorce. Depressive themes include deprivation, crime and punishment, personal injury and death.

Conclusion

While this boy shows a long history of over-activity, his behavior has been increasingly problematic since his parents' divorce. At the time of testing he occupied a special seat in the front of the room at school. There were many indications of depression in his test records, and his parents' description of an angry, withdrawn child rounds out the picture. His unhappiness was evident when one talked with him. He was referred for therapy to a local mental health center, where his therapist felt his major problem was a guilty sense of responsibility for his parents' divorce and feelings of anger and loss, because his father was out of the house and his mother had to start working which meant he came home to an empty house after school. As the sadness and anger emerged and were dealt with in therapy his anxiety and hyperactivity began to diminish and the school reported significant progress in reading, the subject he was most behind in at school.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may be a sign of masked depression in children, or one component of any overall depressive process.

2. A child may be congenitally hyperactive due to high temperamental activity and impulsivity levels or due to dysfunction of cortical or subcortical structures.

Cytrn and McKnew (1974) found that "masked depressive reaction is by far the most common form of depression in children, while overt depression is more common in adults" (p. 880). Some children we would speculate now, use their hyperactivity to ward off feelings of despair or hopelessness. They may be particularly prone to use this defense if they have congenitally high activity levels anyway.

One will not, of course, pick this up in a superficial evaluation designed to determine whether or not to medicate. The importance of being aware of this possibility when assessing a hyperactive child is supported by the recent finding that depression is one of the most common outcomes in adolescence of early hyperactivity (Cantwell, 1974).

Subject 8

Harold was the full term product of a normal pregnancy and delivery. Developmental milestones were achieved at appropriate ages and there were no pre-school behavior problems. His father had been drafted and sent to Vietnam while his mother was pregnant. He was killed in action and

never saw Harold. Mother says he was an alcoholic and that she thinks he was "schizophrenic" because he had a "dual personality."

Harold encountered problems beginning in first grade, when he was labelled hyperactive. In second grade, a pediatrician examined him and said he could find no neurological signs, but offered stimulant medication, which mother refused. In third grade, the behavior problem was severe enough to cause him to be left back. At the time of testing he was age 9 years, 8 months, and was repeating third grade. His mother feels he is very active, but not a problem at home. He can sit and watch TV for hours.

Intellectual Characteristics

(1) WISC-R

Information	10	Picture Completion	14
Similarities	11	Picture Arrangement	14
Arithmetic	8	Block Design	14
Vocabulary	9	Object Assembly	19
Comprehension	9	Coding	9
Digit Span	10	Mazes	8
Verbal I.Q.	96	Performance I.Q.	128

Full Scale I.Q. 111

As with Cases #2 and #3 this boy shows a significantly higher Performance than Verbal I.Q. It is apparent that he has considerably greater intellectual ability in areas involving visuo-spatial and manipulatory

types of problems than in the area of language functions. Such a pattern may have additional implications with respect to a pre-disposition toward behavioral difficulties. His proficiency in "acting out" types of tasks which require only manipulation of the immediately present stimulus is not matched by the ability to control motility by the imposition of internal verbal controls and implicit verbalization of the consequences. His low score on Mazes may be consistent with this hypothesis in reflecting an inability to visually explore ways to select the most affective action.

(2) WRAT

Reading grade 3.1 (Standard Score of 86, 18th percentile)

Spelling grade 2.9 (Standard Score of 84, 14th percentile)

Arithmetic grade 4.2 (Standard Score of 96, 39th percentile)

Harold's repetition of third grade must be taken into account here. While his achievement is low for his age, as reflected in Standard Scores and percentiles, he is at grade-appropriate levels. More interesting is that according to a study by Rourke and Finlayson (Note 5) children who are relatively adept at arithmetic as compared to their performance in reading and spelling perform in a fashion, on neuropsychological testing, that would be

expected if they had a relatively dysfunctional left cerebral hemisphere. This would be consistent with Harold's Verbal-Performance disparity on the WISC-R.

Neuropsychological Characteristics

(1) VMI Age equivalent = 11-9

(2) Purdue Pegboard
Right hand--12 pegs placed (1.7 SD's below mean)
Left hand --12 pegs placed (0.5 SD's below mean)
Bilateral --10 pegs placed (0.9 SD's below mean)

(3) Finger Agnosia
Right hand--8/20 errors
Left hand --2/20 errors

(4) Wepman Auditory Discrimination Test--no errors

(5) Spreen Benton Aphasia Battery

(6) Bushke Memory and Learning Evaluation
Unable to learn list of 10 words in 15 trials. Begin 2 SD's below the mean at age 8 would involve learning the list in 12 trials.

(7) ITPA
Auditory Reception--Standard Score = 32 (within 1 SD)
Sound Blending--Standard Score = 39 (Average)

The hypothesis of relative dysfunction of the left cerebral hemisphere is supported by (1) impaired performance with right hand on the Purdue Pegboard; (2) right-sided finger agnosia; (3) moderate to severe language comprehension deficit.

Social Characteristics

He has several close friends in his neighborhood, but is relatively isolated at school where his behavior

is more immature. His own description of school relations seems somewhat paranoid: "They pick on me and try to get me to steal." His teacher felt these were untrue as far as she knew.

Emotional Characteristics

His parents report that he whines and complains often. "He sticks pretty close to home." His parents have a foster child in their home, a nine-year-old girl, and they feel that Harold is annoyed by this. He gets along well with his brothers, ages 2 and 3-1/2, by his mother's second marriage. His stepfather is a minister, and there is much talk at home of the devil.

On the Rorschach, his F% of 77 is somewhat higher than expected at his age, but of greater interest is his F+% of 64. The mean F+% at age 9 is 84% (Ames, 1974). He seems to find it easy to "shift away from well-defined representations of real objects to more malleable representations of fantasy objects" (Appelbaum, Note 3, p. 19). His reality testing is not as secure as it should be at this age. But there is only one deviant verbalization and no other signs of pathology. Overall, it is an age-appropriate record, except as noted above.

His readiness to slip off into fantasy is more sharply reflected in his TAT stories. For example on 7BM he says:

> These two men are walking. One man (older) is telling scary secrets about a black shadow with teeth that came in his window and cut his face. Then the young man had the same thing happen to him. (?) If it was the devil it could happen that way.

Evaluating such stories is complicated by the fact that his parents use devil-fantasies to frighten him. But the predominance of hostile fantasy material throughout the TAT suggests an intense struggle with angry feelings which leaves him frightened and uncomfortable.

Conclusion

Harold's hyperactivity may be attributed to a cognitively based impairment in verbal abilities necessary for voluntary control of behavior, as well as to anxiety over his intense angry fantasies. A real language comprehension deficit has also probably contributed to his school failure and retention in third grade. Paying attention and behaving appropriate is a constant struggle when you do not understand what is being told to you.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may be partially determined by a deficit in verbal-conceptual skills necessary for internal verbal control of behavior and for rationalizing one's behavior in complex situations.

2. Hyperactivity may sometimes be a manifestation of agitation in a state of anxiety.

3. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

The contribution of chronic anxiety, struggles with painful or frightening fantasies, and other emotional disturbances to hyperactivity has been evidenced often enough in this small sample to be taken seriously as a possibly common factor in this behavior pattern.

The presence in three cases, out of the eight presented so far, of a relative deficit in verbal skills as compared with a proficiency in action-oriented tasks may suggest that for some children motor activity remains a dominant means of contact with the environment well through the early school years. This, of course, is incompatible with normal classroom expectations.

Subject 9

Joseph and his brother (Thomas, case #10) were both referred by their school. Joseph was his mother's third child and was the full term product of a normal

pregnancy and delivery. Developmental milestones were achieved at appropriate ages. There was no history of behavior problems at home or in school until second grade, when brother Thomas was started on Ritalin. However, this also coincided with mother's divorce and remarriage. He is 9 years, 9 months of age and in third grade.

Intellectual Characteristics

(1) WISC-R

Information	8	Picture Completion	9
Similarities	3	Picture Arrangement	10
Arithmetic	10	Block Design	9
Vocabulary	7	Object Assembly	8
Comprehension	8	Coding	8
Digit Span	9	Mazes	7
Verbal I.Q.	82	Performance I.Q.	91

Full Scale I.Q. 85

Except for Similarities, the Verbal and Performance scales are relatively consistent and there is no remarkable subtest scatter. Joseph is intellectually functioning at the low end of the average range. Similarities is considered to be a measure of verbal concept formation (Rapaport, 1970). According to Rapaport: "Concept formation is the function which informs the human being about the 'belonging together' of the objects and events of his everyday world" (p. 99). Joseph's poor performance on this test suggests that his ability to understand the essential nature of problem situations and to see various aspects of these problems in proper relationship is somewhat impaired

(Reitan, 1972). Thus, a basic component of rational understanding and behavioral control is not as strong as it should be at this age.

(2) WRAT

Reading grade 2.3 (Standard Score of 79, 8th percentile)

Spelling grade 2.9 (Standard Score of 84, 14th percentile)

Arithmetic grade 3.2 (Standard Score of 87, 19th percentile)

His academic achievement appears to be consistent with his intellectual functioning, although below grade-appropriate levels.

Neuropsychological Characteristics

(1) Spreen-Benton Sphasia Battery
Language Comprehension (1.5 SD's below mean)
Imitative Speech (Average)
Naming Test 3/30 errors (mild word finding difficulty)

(2) ITPA
Auditory Reception: Scaled Score = 24 (2 SD's below mean)
Sound Blending: Scaled Score = 42 (1 SD above mean)

(3) VMI Age equivalent = 10-11

(4) Purdue Pegboard
Right hand--13 pegs placed (1 SD below mean)
Left hand --12 pegs placed (0.5 SD below mean)
Bilateral -- 9 pegs placed (1.7 SD's below mean)

(5) Test of Concept Utilization
Of the 5 concept domains measured, he performed normally on color and shape relations, but poorly

on relational function, homogeneous function and abstract function.

(6) Bushke Memory and Learning Evaluation
Greater than 2 SD's below mean for his age.

(7) Finger Agnosia
Right hand--2/20 errors
Left hand --1/20 errors

(8) Wepman Auditory Discrimination Test
2/50 errors (no deficit)

Joseph evidences a mild to moderate impairment in language comprehension, auditory reception, concept utilization, and verbal memory. It may be hypothesized that he has difficulty in understanding integrated aspects and relationships of complex situations, and perhaps in the use of internal verbalization to control behavior.

Social Characteristics

Both his parents and his teacher report that Joseph makes friends easily and keeps them. He does show jealously of attention given to others, and once left his classroom when the teacher would not let him read first.

Emotional Characteristics

There are several signs of psychopathology in his Rorschach record. His F% of 90 and "new F%" of 100 (this takes into account not only the pure form responses but all those involving other determinants subordinate to the form determinants) suggests the presence of strong inhibition. But the low F+% of 53 and "new F+%" of 47, combined with

4F- and one contamination, offers clear evidence of some disturbance in reality testing. "The alternation between cautiously constrictive control and intermittent, rather serious misperceptions of reality suggests some kind of borderline state, with tenuous reality contact despite the constriction and guardedness" (Appelbaum, 1972, Appendix).

In his TAT record, there are indications of strong suppressed aggressions which accumulate to become indicators of severe pathology. For example, on card I he tells a story of a boy with a bow-and-arrow killing the men who killed his mother "just for fun when they were drunk." In addition to the aggressiveness, the content of this fantasy borders on the bizarre and unacceptable, as does his response to 12M: "A boy lived in a house. One day he opened the door and something went straight into his eyes and blinded him."

His parents report that he seems angry to them all the time, very often comes home enraged at some injustice suffered at the hands of playmates, and is extremely jealous of attention given to siblings.

Conclusion

Poor performance on tests of concept formation, impairments in several verbal skills, evidence of disturbed reality testing, strong suppressed aggressions and bizarre

fantasies converge to indicate a borderline psychotic state with primary or associated secondary cognitive impairment. Clearly, several basic components of self-control are severely impaired. It would be hard to conclude that all these symptoms are secondary to the hyperactivity which in turn is due to a basic neurological dysfunction in activation inhibition centers. Unless one is committed to a primary neurological diagnosis, the evidence here would suggest that the behavior disorder is secondary to severe personality disorder and cognitive dysfunction.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may be part of a borderline-psychotic or psychotic condition. As such it represents the overwhelming of the ego by anxiety and the loss of behavioral control, whereas in hypothesis 4 hyperactivity may be a last ditch effort to control anxiety.

2. Hyperactivity may be partially determined by a deficit in verbal-conceptual skills necessary for internal verbal control of behavior and for rationalizing one's behavior in complex situations.

3. Hyperactivity may represent the discharge of drive tension (e.g., aggressive energy) or affect in motor activity.

4. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

On the basis of the cases considered so far, it seems that severe behavioral deviations with increase of motility leading to incessant activity may be a part of a serious disturbance in cognitive organization, emotional organization, or both. Research studies and clinical procedures which examine one factor in an attempt to "explain" behavioral deviations cannot understand any one child's unique problem. The concept of a multiplicity of factors is suggested as more responsive to the complex nature of disturbances in activity level.

Subject 10

Thomas is the younger brother of Joseph, presented as Case #9. He is 8 years old and is in second grade. While his mother could recall no behavior problems with Joseph at home, she considered Thomas to have been overactive and difficult to manage since infancy. She was not surprised that he was labelled hyperactive in kindergarten and complied with his first grade teacher's suggestion of

a medical examination. He was begun on Ritalin in January of second grade. This made him more manageable in school and at home, but he was still seen as hyperactive and hyper-aggressive. He partook in a special training group to reduce aggressive behaviors through verbal self-control. The aggressiveness decreased slightly, but the overall hyperactivity remained a problem. The pediatrician felt stronger dosages were inappropriate.

Intellectual Characteristics

(1) WISC-R

Information	7	Picture Completion	15
Similarities	8	Picture Arrangement	15
Arithmetic	10	Block Design	8
Vocabulary	6	Object Assembly	10
Comprehension	10	Coding	9
Digit Span	8	Mazes	19
Verbal I.Q.	88	Performance I.Q.	108

Full Scale I.Q. 97

As part of the project on hyperaggressive children, Thomas had been administered the Block Design, Object Assembly and Mazes subtests the day before he was given the WISC-R for this study. Since the former project was run by a very experienced psychologist, these tests were not repeated and the scores reported are from that testing.

Despite the longer history of behavior problems Thomas was functioning at a generally higher intellectual level than Joseph. He had also shown considerable improvement since being tested about four months earlier in school,

just one week after having begun medication and the group for hyperaggressiveness. At that time, his partial WISC-R battery suggested a Verbal I.Q. of 60, Performance I.Q. of 92, and a Full Scale I.Q. of 74. The Verbal-Performance disparity, however, remained significant. As with other such cases, this may suggest a relative weakness in the skills necessary for rationalizing behavior and imposing internal controls.

Within the Performance scales his visual-motor constructional skills were lower than measures of visual concentration, planning and anticipation. In discussing Block Design, Object Assembly and Coding as tests of visual motor coordination, Rapaport (1970) states:

> Acute tension, anxiety, and hyperactivity are some factors whose impact on motor action prevents whatever visual organization would bring about. On the other hand, schizophrenic chronicity and deterioration may result in visual disorganization, preventing the breakdown of visual patterns into parts (p. 141).

To tease out these factors, Thomas was later brought back and given a Raven Matrices which suggested that visual organization skills were quite good. This left the motor component as responsible for the lower scores on Block Design, Object Assembly and Coding. Following Rapaport, such results raise the question of "acute tension, anxiety and hyperactivity."

(2) WRAT

Reading grade 2.8 (Standard Score of 95, 37th percentile)

Spelling grade 2.2 (Standard Score of 88, 21st percentile)

Arithmetic grade 2.8 (Standard Score of 95, 37th percentile)

Academic achievement is at grade-appropriate level.

Neuropsychological Characteristics

(1) VMI Age equivalent = 5-7

(2) Purdue Pegboard
Right hand--10 pegs placed (2.1 SD's below mean)
Left hand --10 pegs placed (1 SD below mean)
Bilateral -- 9 pegs placed (1 SD below mean)

(3) Raven's Matrices: almost at 75th percentile

(4) Finger Agnosia
Right hand--7/20 errors
Left hand --3/20 errors

(5) Bushke Memory and Learning Evaluation
At least 2 SD's below age appropriate performance level

(6) Spreen-Benton Aphasia Battery
Language Comprehension: Score = 154 (1 SD below mean)
Imitative Speech: Score = 10 (1 SD below mean)
Anomia: None observed

(7) ITPA
Auditory Reception: Standard Score = 30 (1 SD below mean)
Sound Blending: SS = 36 (Average)

Several findings support the conclusion of relative left cerebral dysfunction: (1) Despite the fact that he is right-handed and right-footed, his performance with his

right hand on the Purdue Pegboard is no better than his left. According to Rapin, et al. (1966) only his right hand performance is below normal; (2) tactile sensation is poorer with the right hand than with the left; (3) language comprehension and verbal memory are mildly to moderately impaired. These results are consistent with the significantly lower Verbal I.Q.

Social Characteristics

Thomas had some friends, but his interactions with other children were more often bossy and aggressive, including physical aggression. His parents did not feel he was as angry as Joseph, but that he always wanted to have his way.

Emotional Characteristics

His parents report that Thomas whines and complains too much, that he cannot seem to shut himself off. He gives only 18% W in comparison with a mean of 55% for his age (Ames, 1974). Exner (1974) reports: "Beck (1945) and Klopfer (1954) both suggest that where D is overemphasized, the subject may be more concerned with more practical, concrete interests, often at the expense of his full intellectual potential; that is, he is preoccupied with the obvious and relucant to test out his own resources" (p. 237).

His F% of 93 suggests an attempt to maintain a constricted, defensive position, and to delay affect. On those few occasions during the test when he does yield to affective pressure it is either in the form of a pure C response or color naming. The former suggests extreme lack of control and the latter an impotent handling of affect (Appelbaum, 1972). The total picture suggests a boy who tries very hard to contain his affective life because when he does not, he either loses control or passively experiences the feeling without being able to do anything about it. In school, he apparently lost control often enough to end up in a group for hyperaggressive children.

His low F+% of 48 compares with a mean of 87% for eight-year-olds. Such a finding could be representative of severe psychopathology, serious intellectual limitations, or brain dysfunction. Regardless of etiology, after reviewing the literature on F+%, Exner (1974) concluded that it is a reasonable index of the capacity to deal effectively with stresses. Finally, Appelbaum (1972) suggests that "a low F+ percent is usually a valid indication of poor reality testing or limited intelligence" (Appendix 5, p. 7). Since Thomas' intellectual functioning is within the average range, the latter hypothesis is unlikely.

The TAT adds considerably to our understanding of this boy. It reveals a strong feeling of inadequacy with

accompanying depression, frustration and anger. It also clearly reflected his sadness over leaving his grandmother when his mother remarried and moved to Denver. A more serious pathological indicator is the presence of two stories in which a boy kills his grandmother for money. Rapaport considered such stories to be psychotic or pre-psychotic indicators.

Conclusion

Thomas appears to be a seriously disturbed boy whose hyperactivity is a reflection of his inability to control his affects or deal effectively with stress. His poor verbal skills, apparently neurologically determined, may indicate a predisposition toward loss of behavioral control within this context of severe pathology.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may represent the discharge of drive tension (e.g., aggressive energy) or affect in motor activity.

2. Hyperactivity may be partially determined by a deficit in verbal-conceptual skills necessary for internal verbal control of behavior and for rationalizing one's behavior in complex situations.

3. A child may be congenitally hyperactive due to high temperamental activity and impulsivity levels or due

to dysfunction of cortical or subcortical structures.

4. Hyperactivity may be part of a borderline-psychotic or psychotic condition. As such it represents the overwhelming of the ego by anxiety and the loss of behavioral control, whereas in hypothesis 4 hyperactivity may be a last ditch effort to control anxiety.

5. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

According to Santostefano (1971): "There are three alternative means to express the same drive (or affect): action, fantasy, and verbal (language) systems of behaving" (p. 144). This boy's behavior, including hyperactivity and hyperaggressiveness, may be presumed to represent "action expressions involving a high degree of directness, little delay, and relative social inappropriateness." An unfortunate convergence of poor cognitive controls and severe emotional disturbance have combined to produce a behavioral deviation.

The notion of hyperactivity as one manifestation of a general class of behavioral deviations was introduced

in the discussion of Case #9 as a conceptual transition to an idea presented by Arieti (1971). He suggests that hyperactivity is one of many psychopathologies of action, the common denominator of which is: "A motor activity which escapes voluntary control and which results from various degrees of psychological unrest" (p. 318). If psychological unrest in one form or another is a primary motivator of motor activity, and if voluntary control of motor activity is a developmental achievement based on various cognitive skills and structures, then we can view hyperactivity in the schema which appears in Figure 1.

The vertical line represents the degree of development of those cognitive structures involved in behavioral self-control. These include: (1) verbal-conceptual abilities necessary for internal verbal control of behavior and for rationalizing one's behavior in complex situations; (2) perceptual analytic-structuring skills and motor-conceptual skills which provide motor and spatial stability and allow adequate structuring of the outside world and oneself in relation to it, and through which realistic, adaptive and well-directed behavioral responses can be organized; and (3) ego mechanisms which allow the individual to cope adaptively with stress, or maintain effective defenses on a neurotic level without gross overt behavioral pathology. The horizontal line represents the degree of

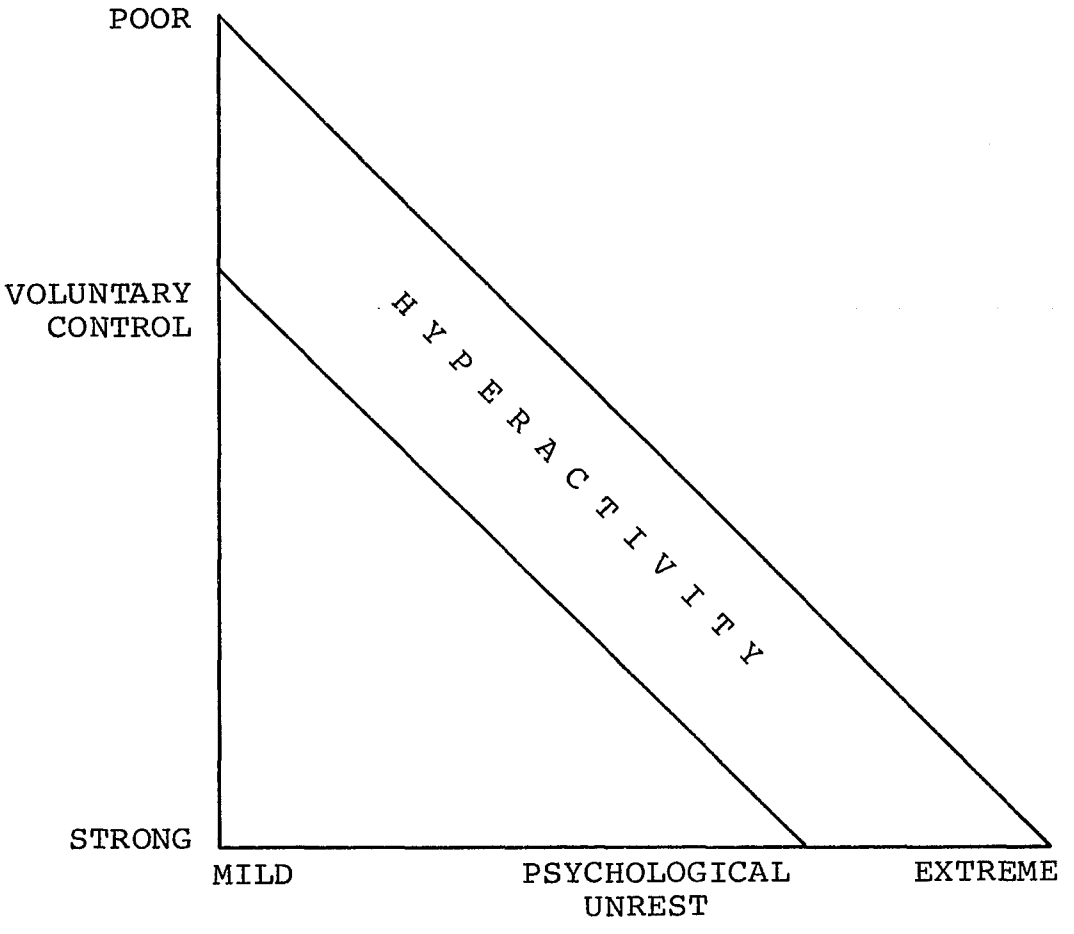

Figure 1. Dynamic Interrelationship Between Psychological Unrest and Capacity for Voluntary Control of Motor Activity

psychological unrest experienced by the child, i.e., his level of tension and anxiety, which is determined by an indefinite number of internal and external stresses, including "temperament" as defined by Thomas et al. (1970). Within this schema, hyperactivity can be hypothesized as that state in which the level of psychological unrest exceeds the capacity of the child to exercise voluntary control over his motor activity.

The remaining cases will be presented in a somewhat briefer format with an emphasis on their relation to this schema.

Subject 11

Terry was a difficult baby who cried a great deal, and was easily frustrated. As a toddler he was much more active than his two older siblings had been. School adjustment was problematic from the start with much hyperactivity, overtalkativeness and fighting. He is 9 years, 10 months, old and in fourth grade.

Intellectual Characteristics

(1) WISC-R

Information	14	Picture Completion	9
Similarities	12	Picture Arrangement	10
Arithmetic	13	Block Design	4
Vocabulary	13	Object Design	9
Comprehension	13	Coding	8
Digit Span	13	Mazes	8
Verbal I.Q.	114	Performance I.Q.	86

Full Scale I.Q. 101

In terms of the schema presented in Case #10, Terry showed very good verbal-conceptual skills, but relatively poor perceptual analytic-structuring and motor-conceptual skills. This raises the question, within that schema, of disability in structuring the environment and himself and in organizing appropriate action patterns.

(2) WRAT

Reading grade 6.8 (Standard Score of 119, 90th percentile)

Spelling grade 6.0 (Standard Score of 112, 79th percentile)

Arithmetic grade 5.0 (Standard score of 103, 58th percentile)

These scores are consistent with his good verbal skills. It is interesting that he performed better on Arithmetic on the WISC-R where problems are presented verbally rather than visuo-spatially. A disparity between Reading and Spelling on the one hand, and Arithmetic on the other, on the WRAT, has been shown to be consistent with relative non-dominant cerebral dysfunction, as were his WISC-R scores.

Neuropsychological Characteristics

(1) VMI Age equivalent = 9-4

(2) Purdue Pegboard
Right hand--12 pegs placed (1.7 SD's below mean)
Left hand --11 pegs placed (1 SD below mean)
Bilateral -- 8 pegs placed (below critical cutoff)

(3) Finger Agnosia
Right hand--8/20 errors
Left hand --2/20 errors

(4) Sound Blending: Scaled score = 46 (above average)

(5) Raven Matrices: Below 25th percentile

(6) Benton Test of Visual Retention: Administration A (10 second exposure with immediate reproduction): 3 correct - 14 errors

(7) EEG: "Poorly organized but within normal limits for his age."

These findings would be consistent with relative right-sided cerebral dysfunction. The scores on the Raven Matrices and Benton suggest moderate to severe deficits in visuo-spatial perception and analysis as well as in visual memory and visuo-motor function. Thus, a basic component of behavioral control is relatively weak.

Social Characteristics

Terry is often in conflict with other children and his teachers. His friends tend to be other boys with behavior and acting out problems.

Emotional Characteristics

Structurally, his Rorschach is relatively non-pathological. However, there are two confabulations in a relatively short record, and one fabulized response, all with aggressive, especially oral aggressive content. They suggest the intrusion of oral aggressive fantasies into a

basically objective orientation to reality, with some loss of control at these times.

His TAT record contains one suicide story, a murder (wife kills husband and is executed), and a story in which a man turns his son into a lion through hypnosis and the son eats his father. The presence of such tabooed aggression as a wife killing her husband, and the bizarre hypnosis fantasy suggest strong aggressive impulses and relatively excessive fantasy life. In other stories, people run away, get hurt or die and are never found, as if no help is possible when one is in trouble. Sometimes he makes a claim of reality for obvious fantasy material.

Overall, his projective test responses suggest an intense struggle with angry feelings and somewhat excessive fantasizing about these. While Terry seems generally able to maintain a constricted, but effective, defensive position ideationally, he seems to be tied to a preoccupation with anger. According to Engel (1972), we can infer from this "that feelings of anger make him very uncomfortable, anxious, and perhaps guilty" (p. 117).

Conclusion

This boy shows severe impairment in the area of perceptual analytic-structuring skills, as well as a moderate to extreme degree of psychological tension and anxiety. In terms of our schema, his hyperactivity is the

result of a weak control structure overstressed by internal conflict.

Our study of this boy generated the following hypotheses:

1. Some children may be hyperactive because their world is spatially and/or motorically unstable. They may not be able to establish a reliable cortical map nor select the proper means to achieve a behavioral goal. Gerstmann syndrome children fit in here, but I include others as well.

2. Hyperactivity may be partly the loss of voluntary motor control in a state of anxiety. The agitated behavior may be a last ditch effort to control the anxiety when other defenses are not functioning well enough.

3. A child may be congenitally hyperactive due to high temperamental activity and impulsivity levels or due to dysfunction of cortical or subcortical structures.

4. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

Subject 12

According to his mother, Perry has been overactive and very aggressive ever since she can remember. He is either running "out of control" or being very angry and destructive. "He hits other children, runs around the classroom all day, uses bad language and breaks things, sometimes accidentally while he's running around and sometimes maliciously."

Perry does not get along with classmates or children in his neighborhood and is involved in frequent fights. He has been in several different schools because of his behavioral problems. He was tried on Ritalin and Cylert but these were discontinued because of adverse side effects.

Perry's mother has been in therapy with a psychiatrist in our medical center for two years. He feels she is a borderline personality who is overwhelmed by anxiety much of the time.

Because of the severity of this boy's problems and the question of residential placement, he was referred for a pediatric neurological exam and an EEG, before psychological testing. Both were clinically unremarkable. Perry is 9 years, 10 months old and is in the fourth grade.

Intellectual Characteristics

(1) WISC-R

Information	12	Picture Completion	15
Similarities	14	Picture Arrangement	13
Arithmetic	7	Block Design	12
Vocabulary	12	Object Assembly	12
Comprehension	12	Coding	10
Digit Span	12	Mazes	10
Verbal I.Q.	108	Performance I.Q.	117

Full Scale I.Q. 113

The Verbal-Performance disparity is not significant. This is essentially a bright child with no primary cognitive deficiencies. The low Arithmetic score may well be a sign of impaired concentration. And the low Coding and Mazes score might reflect psychomotor retardation caused by depression. In fact, a consistent drop in Performance scores can be seen as we move from a passive visual task to those requiring substantial motor involvement. This would be consistent with depression.

(2) WRAT

Reading grade 5.9 (Standard Score of 111, 77th percentile)

Spelling grade 2.9 (Standard Score of 84, 14th percentile)

Arithmetic grade 3.2 (Standard Score of 87, 19th percentile)

His excellent recognition vocabulary appears to result from very good phonic skills which allow him to successfully attack new words. Overall, his other scores are more consistent with his level of work at school.

Neuropsychological Characteristics

(1) VMI Age equivalent = 13-9

(2) Purdue Pegboard
Right hand--15 pegs placed
Left hand --14 pegs placed
Bilateral --12 pegs placed

(3) Finger Agnosia: No errors on either hand

(4) Spreen-Benton Aphasia Battery
Language Comprehension--no errors
Imitative Language--above average
No anomia

(5) Wepman Auditory Discrimination Test: No errors

(6) Sound Blending--Above average

(7) Bushke Memory and Learning Evaluation: No apparent deficit in verbal memory

There is nothing remarkable about any of these findings, except that in several areas he scored higher than any other boy in the sample.

Emotional Characteristics

On his Rorschach, the presence of only 13 responses, the A% of 62 and the P% of 40 are indicative of depressive features because the WISC-R has indicated an above average level of intelligence and has therefore implied that greater productivity and variety would normally be present. The almost complete restriction of responses to W's and the presence of four shading responses in such a short record are diagnostic of an anxiety state (Schafer, 1948).

Feelings of anger abound in his TAT record, suggesting that this is the source of anxiety and depression: A boy fights with his dad and they break each other's things; a boy commits suicide because he doesn't like himself; a boy goes into the army because his mother is mean to him, but he gets shot and then she's sorry; a boy's father gets shot; a boy's mother refuses to give him any food, and later he dreams she died; a girl falls and gets killed; a man slits the throat of a sleeping boy with his long fingernails.

Perry's only defense against his anger seems to be to turn it against himself. This results in depression. The overall result is frequent acting out of angry feelings against a background of anxiety, agitation, and depression.

Conclusion

This seems to be a case where a strong cognitive control structure is overwhelmed by the tension resulting from an unsuccessful struggle with angry feelings. Perry's life seems to be a continuous state of anxious agitation manifested in hyperactivity and impaired concentration with periodic outbursts of aggression.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may represent the discharge of drive tension (e.g., aggressive energy) or affect in motor activity.

2. Hyperactivity may reflect the loss of voluntary motor control in a state of anxiety. The agitation may be an attempt to control the anxiety or to ward off depressive affect, when more suitable defenses are not available to the ego.

3. A child may be congenitally hyperactive due to high temperamental activity and impulsivity levels or due to dysfunction of cortical or subcortical structures.

Subject 13

Adam was referred to the University Day Care Center with extensive documentation of his hyperactivity by parents and teacher. The school felt he could not be maintained in a regular third grade classroom. The data for this project was collected by the author and the Day Care Center staff. Several months of observation at Day Care confirmed the suitability of this 8 year, 11 month old boy for this study.

Intellectual Characteristics

(1) WISC-R

Information	9	Picture Completion	11
Similarities	15	Picture Arrangement	10
Arithmetic	7	Block Design	9

Vocabulary	12	Object Assembly	11
Comprehension	8	Coding	8
Digit Span	7	Mazes	10
Verbal I.Q.	101	Performance I.Q.	101

Full Scale I.Q. 101

Low scores on Arithmetic, Digit Span and Coding suggest impaired attention and concentration, and are often associated with the presence of anxiety and depression. The high Similarities score may indicate a preference for fantasy and abstraction as opposed to concrete tasks. Beyond these possibilities, the subtest scatter is not clinically significant.

(2) WRAT

Reading grade 2.6 (Standard score of 89, 23rd percentile)

Spelling grade of 2.2 (Standard score of 85, 16th percentile)

Arithmetic grade of 2.1 (Standard score of 84, 14th percentile)

These scores put Adam approximately 1/2 year behind in reading, and one year behind in spelling and arithmetic.

Neuropsychological Characteristics

(1) VMI age equivalent = 6-0

(2) Purdue Pegboard
Right hand--12 pegs placed
Left hand --10 pegs placed
Bilateral -- 9 pegs placed

(3) Finger Agnosia
Right hand--1/20 errors
Left hand--1/20 errors

(4) ITPA

Auditory Reception--Scaled score = 28 (-1.3 SD)
Visual Reception--Scaled score = 43 (+1.2 SD)
Verbal Expression--Scaled score = 34 (-0.3 SD)
Manual Expression--Scaled score = 48 (+2 SD)
Sound Blending--Scaled score = 38 (+0.3 SD)

Neuropsychologically, there is nothing remarkable about these results. However, the disparity between Verbal and Manual Expression is interesting in that it suggests that Adam finds it much easier to express ideas through movement rather than with spoken words. This was also true of Case #4, the other case where these two subtests were used.

Social Characteristics

Adam's parents describe him as a withdrawn and often anti-social child. His teacher said he had no friends in school.

Emotional Characteristics

Both the parent interview and the projective test responses suggest severe psychopathology, probably of a psychotic nature. His parents report that Adam claims to see and hear God. He doesn't always say "I" when talking about himself; sometimes he says "you go," or "he goes," when meaning "I go." He is preoccupied with the body parts of others.

On the Rorschach, his poor quality W responses suggest haphazard, arbitrary generalizations in his

thinking. While he relies much more heavily on form than other 8 year olds, the quality of his form perception (F+%) is markedly poor, 53%. Despite constriction and guardedness suggested by the high F%, the frequency of serious misperceptions of reality (5 F- responses) suggests a borderline or psychotic state. Fantasy with vivid imagery, e.g., confabulations and fabulized combinations, is pervasive and colors perception of reality so strongly that at times Adam loses distance from his thoughts and is unable to distinguish fantasy from reality.

On the TAT he begins by describing every detail of Card I with painful meticulousness but does not tell a story. Rapaport (1968) suggests that such constriction of ideation corresponds to the defense mechanism, restriction of the ego. But this gives way quickly to such unnacceptable content as fratricide, which Rapaport considers a psychotic or prepsychotic indicator.

Conclusion

While verbal-conceptual and visual-spatial structures are evenly and adequately developed, reality testing is impaired and mechanisms of defense are relatively weak with resulting lowered capacity to deal with stress. Further, his projective test responses indicate a tendency toward being passively overwhelmed by affect, reflected in his CF and C responses on the Rorschach. "In the sphere

of motor behavior, the parallel to being passively overwhelmed by an affect may be seen in such activities as physical restlessness resulting from drive tension, or impulsive acting out without any or with hardly noticeable affect. In both these cases the decisive factor is that the motor activity has a driven quality rather than resulting from truly active, autonomous decision or intention" (Schachtel, 1966). This tendency may be related to the general impairment of Adam's active, organizing capacity, indicated by his low F+%. Thus, his hyperactivity seems related to his being overwhelmed by affect; to the ineffectiveness of ego defenses against both sexual and aggressive drives (indicated by TAT stories); and to poor reality testing and capacity to deal effectively with stress.

Our study of this boy generated the following hypotheses:

1. Hyperactivity may be part of a borderline-psychotic or psychotic condition. As such it represents the overwhelming of the ego by anxiety and the loss of behavioral control, whereas in hypothesis 4 hyperactivity may be a last ditch effort to control anxiety.

2. Hyperactivity may represent the discharge of drive tension (e.g., aggressive energy) or affect in motor activity.

Subject 14

Dennis was actually the prototype case for this study, and it was in part my inability to understand his hyperactivity when he was first tested that led me into this study. In the light of the previous cases, it seems possible to make some sense of his behavior disorder. Because this case was done by me before the others in this study, the data includes a WISC (without Mazes), rather than a WISC-R, and the Louisville Behavior Checklist was not obtained from the parents, although an extensive parent interview provided similar information.

Dennis was the 7 pound 9 ounce product of a normal pregnancy and delivery. At 11 months he suffered scarlet fever. At age 2 he had asthma, which did not recur until age 7, at which time his mother reports, "it took four injections to get his breath back." His mother also reports that Dennis was a calm baby until around the time he started to walk. Then he seemed very restless and clumsy, falling frequently, often hitting his head. In speech development also she describes Dennis as being overactive, "talky," but not speaking in intelligible sentences. Even by kindergarten his teacher reported that he still spoke in word-phases. During his second year in first grade, his teachers report he's failing everything. They do not feel they can manage his behavior. He is also hyperactive at

home. He cannot watch TV for more than 20 minutes and is impossible to manage in a supermarket or department store. He has wandered away from home for hours. He is 7 years, 7 months old.

During testing his talking was ceaseless, although often disconnected and difficult to understand. He was in and out of his chair, playing with anything he could reach, crawling under the table.

Intellectual Characteristics

(1) WISC-R

Information	8	Picture Completion	7
Similarities	10	Picture Arrangement	10
Arithmetic	7	Block Design	10
Vocabulary	8	Object Assembly	8
Comprehension	6	Coding	3
Digit Span	8	Performance I.Q.	83
Verbal I.Q.	86		

Full Scale I.Q. 83

There is no indication of a disparity between verbal-conceptual skills and perceptual-analytic structuring skills. However, in both areas he was below average, so perhaps neither cognitive control structure was very strong.

(2) WRAT

Reading grade 3.5 (Standard score 110, 75th percentile)

Spelling grade 3.5 (Standard score 110, 75th percentile)

Arithmetic grade 1.6 (Standard score 84, 14th percentile)

Despite apparent school failure through two years in first grade, Dennis has been learning and has amassed an above average recognition vocabulary. Also, paragraph reading and comprehension as measured by the Gray Oral Reading Test are at the 2.0 grade level.

Neuropsychological Characteristics

(1) VMI age equivalent = 5.7

(2) Purdue Pegboard (Left-handed subject)
Right hand--8 pegs placed
Left hand --9 pegs placed
Bilateral --7 pegs placed

(3) Bushke Memory and Learning Evaluation
Verbal memory performance was more than 2 SD below the mean

(4) Wepman Auditory Discrimination Test
Mild deficit

(5) Spreen-Benton Aphasia Battery (partial)
Language comprehension--more than 2 SD below mean
Imitative speech--Average
Word Finding--No anomia observed

(6) ITPA (partial)
Visual Association--Scaled score = 37 (+0.2 SD)
Auditory Association--Scaled score = 31 (-1 SD)
Sound Blending--Scaled score = 49 (+2 SD)

(7) Raven Matrices--Scored between 50th and 75th percentile

(8) Finger Agnosia
Right hand--1/20 errors
Left hand--5/20 errors

(9) Left-right disorientation

Presence of a Developmental Gerstmann syndrome was indicated by the following clinical findings: below average mathematical reasoning; poor verbal labels for temporal-spatial events (before-after, in front-behind); left finger agnosia; left right disorientation. As with Case #1, this would lead to difficulty in executing purposeful goal directed operations, thus contributing to the hyperactive pattern of purposeless, undirected behavior.

Social Characteristics

Dennis' behavior was so immature and disorganized that he was unable to make any friends, or even participate in activities with other children.

Emotional Characteristics

Dennis' Rorschach responses were overwhelmingly idiosyncratic and autistic. Of his pure form responses 40% (8/20) were at the F-level. Other indicators of psychotic disorganization included: (1) low F'+% (Rapaport's new F+%) of 50; (2) four pure C responses as opposed to two FC; (3) at least 40% of the responses involve deviant verbalizations: queer or absurd content, autistic reasoning leading to confabulated concepts, breakdown in interpersonal communication with the examiner leading to a peculiar formulation and often to confusion and incoherence.

On the TAT, we find sudden weird and disconnected fantasies, non-sequiturs, peculiar verbalizations and disjointedness of meaning.

Conclusion

When we first encountered this case, our insistence on the organic etiology of hyperactivity blinded us to the strikingly severe psychotic indicators. In the light of the previous cases examined, Dennis' hyperactivity can be seen as one part of a larger picture rather than as a discrete clinical entity. He manifests a disturbance not only in motility, but also in thought, language, affect and perception. His thinking is both primitive and peculiar. Focusing exclusively on his hyperactivity, as was done before we began this study, is like describing New York as the city where the Empire State Building is located. It just happens to be the most obvious spot on the landscape.

According to our model, at least two cognitive structures involved in behavioral control are not functioning well. First, the ego mechanisms which are necessary to cope with stress are so poorly developed that primitive and threatening images with their attached dosage of anxiety are constantly in consciousness. The general looseness of ego boundaries can be observed, during interview and projective testing, in his illogical and disconnected thinking. Polansky (1971) adds another aspect of

looseness of ego boundaries: the inability to hold steadily to a task one has assigned oneself. This is a frequently described feature of hyperactivity. He also adds the inability to control impulses. Ego psychological theory would predict that Dennis is "unable to bind impulses, but must give way to them immediately or else suffer extreme discomfort" (Polansky, p. 63). Finally, loose ego boundaries impede "precise thought and planful, coordinated action."

In addition to these deficiencies, we noted earlier the presence of a Developmental Gerstmann Syndrome, implying some dysfunction of the posterior part of the hemispheres. According to Jeanerod (1972), this will cause problems in "the establishment of the cortical map and in the selection of the goal. The subject experiences consistent lack of concordance between information obtained and expected, due to the uncertainty about what is to be expected and to the poor quality of spatial assumptions" (p. 89). This also impairs planful, coordinated action, and, conversely, may lead to undirected seemingly purposeless activity, which we call hyperactivity when it occurs in children.

Our study of this boy generated the following hypotheses:

1. A child may be congenitally hyperactive due to high temperamental activity and impulsivity levels or due to dysfunction of cortical or subcortical structures.

2. Hyperactivity may be part of a borderline-psychotic or psychotic condition. As such it represents the overwhelming of the ego by anxiety and the loss of behavioral control, whereas in hypothesis 4 hyperactivity may be a last ditch effort to control anxiety.

3. Some children may be hyperactive because their world is spatially and/or motorically unstable. They may not be able to establish a reliable cortical map nor select the proper means to achieve a behavioral goal. Gerstmann syndrome children fit in here, but I include others as well.

4. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

Subject 15

George's mother called our Child Psychiatry Clinic because his teacher had reported severe behavior problems in school. An interview with the teacher and principal confirmed his suitability for this study. His third grade

teacher had suggested that he was hyperactive and by December of third grade he was on Ritalin 10 mg. twice a day. This was his dosage at the time of testing. Only slight improvement was noted. A trial at 40 mg. a day did not produce any further change in behavior and seemed to affect his sleep, so he was maintained at 20 mg. a day. In fourth grade, his teacher reported, his behavior problems seemed more severe than in third grade, and were even more disturbing since his classmates had settled down and matured from the previous year making George more conspicuous.

In terms of history, George was adopted at 2 weeks of age. His parents already had a two year old daughter. He had a left parietal cephalo-hematoma at birth, which diminished naturally. No other problems were noted and developmental milestones seem to have been within normal limits. His parents describe him as a very active infant who, when startled or angry, had "an unusually loud high-pitched scream that was unnerving." During toilet training at age 2, George voided on the kitchen floor and his mother spanked him soundly and yelled vigorously. She recalls "I had extreme guilt feelings afterward, but there were no more problems."

George attended pre-school at age 4. He separated relatively easily and was initially happy. After a few months, however, he began crying when he had to leave the

house and complained of stomach pains. His kindergarten, first and second grade teachers reported crying before and during school and felt he was nervous and frightened all day long. He would come home from school crying about being bullied. His parents remember him as a nervous, scared, timid boy.

In November of third grade following her two month hospitalization for cancer surgery, George's mother went for a parent-teacher meeting and was surprised to hear that he was viewed as an overactive behavior problem. He was already manifesting the symptom pattern critical for this study. After a month of notes and phone calls from his school, George's mother brought him to a pediatrician who prescribed Ritalin. He continued to be hyperactive in school and at home began to show temper tantrums which increased in frequency. He is still restless and fidgety at home. He cannot watch TV for more than 20 minutes. He "goes wild" in department stores and supermarkets.

Although it had not been pointed out before his mother readily agreed that the sudden change from anxious, frightened and timid to hyperactive and tempermentally explosive coincided with her hospitalization. Based on the previous cases it seems plausible that this might

represent a shift in how he handled anxiety, a shift from passive to active.

About himself George said: "I can't sit still and it feels frustrating. I like to play checkers but I can't pay attention for more than 15 minutes, so no one wants to play with me." He is 9 years, 10 months of age.

Intellectual Characteristics

(1) WISC-R

Information	18	Picture Completion	11
Similarities	10	Picture Arrangement	10
Arithmetic	14	Block Design	12
Vocabulary	16	Object Assembly	9
Comprehension	13	Coding	14
Digit Span	11	Mazes	9
Verbal I.Q.	125	Performance I.Q.	108

Full Scale I.Q. 120

The Verbal-Performance I.Q. disparity is significant. Within the Verbal scales, Similarities is notably low. Although there are differences, in one respect this profile resembles that in Case #2. The average score for Picture Arrangement, Object Assembly and Mazes is 3 points lower than the average score for Picture Completion, Block Design and Coding. As we hypothesized in Case #2, this may suggest a relative deficiency in the ability to conceptualize or visually anticipate how things go together or what the final product will be. When we add in the relatively low Similarities score, the deficit cuts across verbal and non-verbal areas. Extrapolating to school behavior, perhaps

George inadequately analyzes situations and is unable to clarify the situation to himself or to participate adequately in what is going on. Basic components of behavioral control--the abilities to conceptualize and anticipate--are not as strong as they might be.

(2) WRAT

Reading grade 8.1 (Standard score of 130, 98th percentile)

Spelling grade 6.0 (Standard score of 112, 79th percentile)

Arithmetic grade 5.2 (Standard score of 105, 63rd percentile)

All academic skills measured were above average, which is consonant with school reports of average to above average achievement.

Neuropsychological Characteristics

(1) VMI age equivalent = 6-10 (graphmotor discoordination seen in tremor, overshoots and gaps)

(2) Purdue Pegboard

During first testing session without Ritalin
Right hand--15 pegs placed
Left hand --15 pegs placed
Bilateral --13 pegs placed

During later session with Ritalin
Right hand--13 pegs placed
Left hand --14 pegs placed
Bilateral --11 pegs placed

(3) Raven's Matrices--Standard score of 90, 25th percentile

(4) Finger Agnosia

Right hand--5/20 errors
Left hand --8/20 errors

(5) Benton Visual Retention Test (Administration A, 10 second exposure with immediate reproduction from memory) Correct 4/10 Errors 8

(6) Sound Blending--Scaled score = 40 (average)

(7) EEG--The report stated that "the poor (but normal) organization of the EEG might relate to other areas in the psychophysiological realm but this is a topic for research rather than clinical diagnosis."

Several of the above findings would be consistent with relative cerebral dysfunction in the posterior area of the right hemisphere: (1) deficit in visual-spatial analytic skills manifested in VMI age equivalent and the pattern of Performance I.Q. lower than Verbal I.Q., with Raven Matrices still lower than Performance I.Q.; and (2) finger agnosia, more severe on left hand.

Social Characteristics

George has a few close friends at school at any one time, but they vary. He makes friends easily, but cannot play for long without conflict. He needs to be the center of attention. He becomes enraged when he loses at games.

Emotional Characteristics

On the Rorschach, and F+% of 33 suggests severe psychopathology and a limited capacity to tolerate stress (Exner, 1974). The presence of four color responses, including a C and CF, in such a short record with no movement responses, indicates a tendency toward affective

discharge toward the environment. Schachtel (1966) suggests: "In the sphere of motor behavior, the parallel to being passively overwhelmed by an affect may be seen in such activities as physical restlessness resulting from drive tension" (p. 167).

After three months in therapy, Geroge was diagnosed as an anxiety neurotic with phobic tendencies, as well as showing signs of an emerging tension-discharge disorder.

Conclusion

The degree of psychological unrest in George was undeniable. He was an essentially bright child who was afraid of going to school, cried whenever he made a mistake in class, was constantly restless and agitated, and was subject to unprovoked emotional outbursts. Repression and other defenses were failing. His perceptual-analytic structuring skills were relatively weak, leading to poor problem solving skills and difficulty in organizing himself. Even his relatively strong verbal skills showed a weakness in the conceptual realm. Overall the picture was one of a rather weak cognitive control structure overwhelmed by much internal psychological stress.

Our study of this boy generated the following hypotheses:

1. Some children may be hyperactive because their world is spatially and/or motorically unstable. They may

not be able to establish a reliable cortical map nor select the proper means to achieve a behavioral goal. Gerstmann syndrome children fit in here, but I include others as well.

2. Hyperactivity may be a bodily manifestation of anxiety.

3. Hyperactivity may represent the discharge of drive tension (e.g., aggressive energy) or affect in motor activity.

4. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Intensive study of 15 hyperactive boys revealed that these children do not present a uniform diagnostic picture in intellectual, neuropsychological, social or emotional spheres. In terms of diagnostic categories suggested by the Group for the Advancement of Psychiatry (1966), their hyperactivity was seen to be part of a neurotic personality, or psychotic disorder. Only a broad interactional model which involves both internal developmental structures and various sources of psychological tension can serve as a framework within which to further explore hyperactivity. Such models have evolved in the study of almost all other types of psychopathology, from school phobia to schizophrenia. The history of research on hyperactivity, however, has been a quest for simple answers. The observation that some postencephalitic children and brain injured soldiers became impulsive, restless and distractible led, via circular reasoning, to the conclusion that all children who exhibit such behavior must also have brain damage, even if no one can find it. Coupled with the assumption, following Bradley's early

work, that a cure had been found in stimulant medication, little serious thinking or research took place outside of this brain dysfunction-medication model. The feeling of closure provided by this model, led quickly to a plethora of hypothesis-testing studies aimed at isolating the single causative factor. Most recently this has involved the idea that a sub-cortical reticular activating system dysfunction is responsible for hyperactivity and that stimulants correct the imbalance.

Recently, however, the validity of this model has been questioned by reviews of the stimulant medication literature which show that they are ineffective as often as they are effective in controlling hyperactivity; and outcome studies of childhood hyperactivity from which the following conclusions emerged (as summarized by Cantwell (1975)):

> (1) Prospective and retrospective follow-up studies of hyperactive children indicate that they are prone to develop significant psychiatric and social problems in adolescence and later life.
>
> (2) Antisocial behavior, serious academic retardation, poor self-image and depression seem to be the most common outcomes in adolescence.
>
> (3) Alcoholism, sociopathy, hysteria and possible psychosis seem to be likely psychiatric outcomes in adulthood.
>
> (4) Evidence for indicators of prognosis is limited and contradictory.

> (5) It has not been clearly demonstrated that treatment of any type significantly affects the long-term outcome of the hyperactive child.

Such a wide variety of psychopathological outcomes in adolescence and adulthood suggested that indications of such pathology might be present in latency age hyperactive children. As opposed to the literature on other childhood disorders, however, that on hyperactivity contained no detailed case studies which might yield such information. This was surprising because hypothesis-generating case study investigations have produced much of the clinically useful data available on childhood and adult psychopathology, and because the case study method has been shown to be especially effective in areas where little is known for certain and no acceptable paradigm for research and theory is available.

I undertook this study in response to this situation. The findings were presented in detailed case study format to stress the individual differences which exist in even a small sample of such children. I will now briefly overview the hypotheses that emerged and the findings in the areas of intellectual functioning, neuropsychology, social and emotional characteristics.

Hypotheses

The generating of new hypotheses about hyperactivity was the primary aim of this study. In the course of presenting the 15 case studies, I formulated 8 such hypotheses.

1. Hyperactivity may be partially determined by a deficit in verbal-conceptual skills necessary for internal verbal control of behavior and for rationalizing one's behavior in complex situations.

2. Some children may be hyperactive because their world is spatially and/or motorically unstable. They may not be able to establish a reliable cortical map nor select the proper means to achieve a behavioral goal. Gerstmann syndrome children fit in here, but I include others as well.

3. Hyperactivity may be a response to the frustration of academic demands which cannot be met or, conversely, which are boring due to inappropriate class placement; that is, a child may become restless and inattentive when his schoolwork is too easy or too difficult.

4. Hyperactivity may be a bodily manifestation of anxiety.

5. Hyperactivity may be a form of masked depression.

6. Hyperactivity may represent the discharge of drive tension (e.g., aggressive energy) or affect in motor activity.

7. Hyperactivity may be part of a borderline-psychotic or psychotic condition. As such it represents the overwhelming of the ego by anxiety and the loss of behavioral control, whereas in hypothesis 4 hyperactivity may be a last ditch effort to control anxiety.

8. A child may be congenitally hyperactive due to high temperamental activity and impulsivity levels or due to dysfunction of cortical or subcortical structures.

Table 1, on the following page, summarizes the frequency with which each hypothesis appeared. However, in such a small sample, relative frequency should not be equated with potential importance of any hypothesis.

Some hypotheses cluster. Number 3 (frustration) tends naturally to result from the presence of significant cognitive-neuropsychological deficits (numbers 1 and 2), which impede learning. Conversely, some hypotheses might seem to a reader to logically belong together, but, in fact, do not appear so in Table 1. For example, anxiety (number 4) may seem to be a necessary component of a borderline or psychotic condition (number 7). The anxiety hypothesis, however, was not listed for a subject unless specific indicators were present. Such indicators

Table 1

Frequency of Hypotheses

Subjects	Hypotheses							
	1	2	3	4	5	6	7	8
1		X	X	X	X	X	X	
2	X		X	X				
3			X	X				X
4	X		X		X	X		
5							X	X
6				X				X
7					X			X
8	X		X	X				
9	X		X			X	X	
10	X		X			X	X	X
11		X	X	X				X
12				X		X		X
13						X	X	
14		X	X				X	X
15		X	X	X		X		
Total	5	4	10	8	3	7	6	8

as a large number of shading responses in the Rorschach record are accepted by most major Rorschach systematizers. Other indicators, such as F+%, are linked with reality testing, but not specifically with anxiety, although the latter may be implied. Thus, several boys classified as borderline or psychotic were not automatically assumed to have a large quantity of free-floating anxiety.

I do not wish to belabor the issue of cluster analysis beyond this point. First, the sample is not sufficient in size to support such an analysis. Second, to prematurely define subcategories might cause us to overlook important possibilities for future research. Instead I will reintroduce the model suggested in the discussion of Subject 10, and relate the hypotheses to this.

I have identified four possible causes of psychological unrest: anxiety, frustration, depression, and drive tension or affect. Three hypotheses refer to structure defects: deficit in the verbal-conceptual system, deficit in the motor-spatial system and severe ego coping deficits inherent in the definition of a borderline or psychotic condition, and possibly present in neurotic or personality disorders to some degree. Hypothesis 8 seems to fit both sides of the model. If

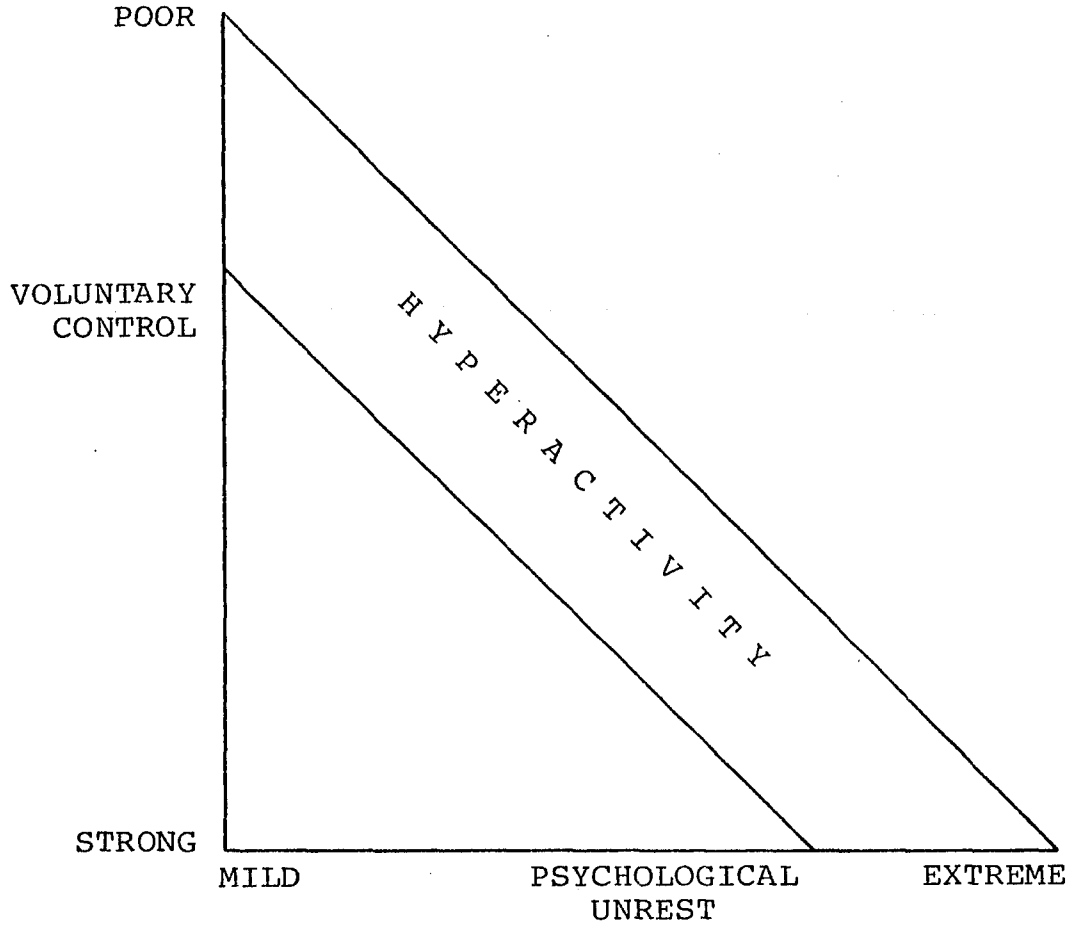

Figure 1. Dynamic Interrelationship Between Psychological Unrest and Capacity for Voluntary Control of Motor Activity

a real sub-cortical or cortical dysfunction was present at birth, this would be a structural deficit. High activity and impulsivity levels in infancy can be viewed as either a structural deficit or a source of stress, in that it conflicts with societal expectations.

The hypothesis of multiple determination was not included in the final list because it is not a specific etiological factor, but a conclusion drawn from the presence of more than one such factor.

This model has the advantage of being able to absorb any new data from future research, and encouraging attention to the biological and psychosocial complexities of any clinical case.

The Question of Parent Loss

One hypothesis which has not been included is the contribution of parent death or separation to the hyperactivity of a child. I omitted this because it is at a different etiological level. The loss may engender anxiety, frustration, depression, or anger which in turn may be manifested in hyperactivity. The connection is not direct, unless one postulates that the purposeless, undirected quality of the hyperactivity is a simple reflection of the search for the lost object. I find it difficult to understand all 7 criteria behaviors in this

light without assuming some intermediate feeling state between loss and behavior.

This is not to minimize the potential importance of parent loss or separation in the development of hyperactivity. In our sample, 12 of the boys had lost a parent through death or divorce, or (in 2 of the 12 cases) had suffered a temporary loss through prolonged hospitalization of their mothers. Subject 1 lost his mother by drowning. Subjects 2 and 15 were separated from their mothers for more than a month due to hospitalization. They both expressed the fear that their mothers would die. Subjects 3, 4, 6, 7, 9, 10, 11 and 12 lost a father through divorce. Subject 8 lost a father through death, but before he ever met him, so the connection is questionable.

According to Bowlby (1973) the most common responses of children to separation and loss are anxiety, anger, and depression, at least one of which was found to be pervasive in the projective test responses of every boy who had suffered such separation or loss. More intriguing, however, is the similarity between the hyperactive behavior pattern in children and the "searching" behavior of bereaved people. According to Parkes (1972) two components of such searching are "alarm, tension, and a high state of arousal" (p. 46); and "restless hyperactivity" (p. 47). The latter, as Parkes (p. 47) states,

was accurately portrayed by Lindemann (1944): ". . . there is a rush of speech . . . There is restlessness, inability to sit still, moving about in an aimless fashion, continually searching for something to do. There is, however, at the same time, a painful lack of capacity to initiate and maintain normal patterns of activity" (p. 141).

This description matches so well with that of the hyperactive behavior pattern in children, that the connection would be worth investigating even if there had not been such a preponderance of separation and loss in our sample. Again, however, the data is not available in literature. In many studies such family background material is not reported. In others, children who did not come from intact families were excluded. Thus, many investigators may have overlooked a major segment of the hyperactive population from study.

The Question of Genetic and Family Factors

Cantwell's (1975) review of familial-genetic research in hyperactivity supports the conclusion that "A significant number of the parents of hyperactive children were themselves hyperactive as children" (p. 103). In our sample, 2 fathers (subjects 5 and 7) and 1 mother (subject 3) reported having been behavior problems as

children. This is similar to Cantwell's (1972) finding that in a sample of 50 hyperactive children, 8 fathers and 2 mothers were thought to have been hyperactive as children; or Morrison and Stewart's (1971) finding that in a sample of 59 hyperactive children there were 12 hyperactive parents. The 20% percent rate seems to be consistent across studies.

Of related interest is the finding that in 2 families (5 and 9-10) the father's drinking was reported to be a serious problem; in one case (number 12) the mother appeared to be a severely anxious woman with little tolerance for stress, who had terminated psychiatric treatment against medical advice after 2 years; in case 3, the mother reported her own inability to deal with her anxiety, and was referred for treatment; and in case 8 the mother reported that the boy's biological father had consistently shown erratic and bizarre behavior before his death.

While this data was not the result of systematic evaluation, it does compare with that obtained by Cantwell (1972) and Morrison and Stewart (1971). The prevalence of psychiatric illness in the parents of hyperactive children merits further study. The research on the family environment of hyperactive children has been minimal. As Cantwell (1975) states: "In contrast to

other psychiatric disorders of childhood, there has been little investigation of familial factors in the hyperactive child syndrome, probably due to the assumption of some 'organic' etiology" (p. 93).

Finally, 5 subjects (1, 5, 9, 10, 11) had at least 1 sibling with past or current behavior or learning problems. This finding might be related to either genetic or enviromental factors, but systematic familial-genetic research is needed to clarify this issue.

Intellectual Characteristics

The mean Full Scale I.Q. for our 15 subjects was 104. Palkes and Stewart (1972) found that the mean WISC Full Scale I.Q. was significantly lower for hyperactive children than for a matched group of normal children. Such nomothetic studies, however, stress measures of central tendency rather than measures of variability, generality rather than uniqueness. The range of Full Scale I.Q.'s in our sample was 83 to 127. Such variability makes it clear that low intellectual potential cannot be considered an essential characteristic of hyperactive children. Similarly, standard scores on the WRAT ranged from 79 to 130 in Reading, 81 to 116 in Spelling, and 77 to 108 in Arithmetic. Thus, overall academic achievement is not necessarily low for a hyperactive child. Several subjects were well-above average

in their classes. What may be a valid generalization is that these boys would do better on both I.Q. and achievement tests, as well as actual school performance, if they could sit still and pay attention.

In our sample, a disparity of more than 15 points between Verbal and Performance I.Q. occurred in 8 out of 15 cases, with performance I.Q. higher in 5 of the 8 cases. Wechsler (1974) considers this a clinically significant split. It suggested to us that a relative weakness in either verbal-conceptual skills or perceptual-analytic skills may be a factor in hyperactivity. The former are important because voluntary control of behavior is a verbally mediated process, and the latter because planful, coordinated action (as opposed to random, purposeless activity) is dependent on correct processing of spatial perceptions and establishment of a spatial-cortical map.

Only two boys presented with Full Scale I.Q.'s below 93 (#'s 9 and 14). Retardation, even mild retardation, was not a factor in this sample.

Neuropsychological Characteristics

In nine cases the neuropsychological testing suggested some cerebral dysfunction: 4 cases of relative left hemisphere dysfunction (all right-handed subjects), 2 cases of relative right hemisphere dysfunction, 1 anterior

corpus callosum dysfunction and 2 developmental Gerstmann syndromes. All 4 cases of dominant hemisphere dysfunction also showed a significantly higher Performance than Verbal I.Q., suggesting a neurologically determined weakness in verbal-conceptual skills. Conversely, both cases of non-dominant hemisphere dysfunction occurred with a significantly higher Verbal I.Q., suggesting a neurologically based visual-spatial weakness. The one case of possible anterior corpus callosum dysfunction carries with it no implication of specific behavioral problems. The Gerstmann syndrome is probably reflective of a posterior (angular gyrus) cerebral dysfunction leading to a weakness in executing planful, coordinated actions.

These findings raise the question of classifying these 8 boys as Chronic Brain Syndromes (GAP, 1966), with a separate diagnosis made of the predominant personality picture in each case. I do not feel this adds significantly to our understanding of these children. In each case the possible cerebral impairment seemed to be restricted to one hemisphere, or in the case of the Gerstmann children to the parietal area. In all these cases, other cerebral areas and functional systems appeared intact. Given such a qualitative analysis of

the disturbances in higher cortical processes, the addition of a diagnosis which carries the description of "diffuse impairment of cerebral tissue function" seems a step backward in understanding and adds nothing to treatment planning. Finally, rather than making an artificial separation between totally organic and completely functional problems, we have suggested a model to integrate both in understanding a severe behavioral disorder.

Social Characteristics

Two thirds of the boys in our group had no friends in school or in their home neighborhood. This finding is consistent with most descriptions of hyperactive children. According to Kohlberg, et al. (1972) lack of peer acceptance is a relatively good predictor of later adjustment difficulties, such as have been reported in follow-up studies of hyperactive children. Since the peers of our subjects were not actually interviewed, little else can be added. Such peer interviews may be useful to include in future studies.

Emotional Characteristics

Meyer (1972) divides inefficiently coping egos into three major groups: "(1) the individual is disorganized by distress and shows no particular defensive

mode; (2) the individual shows a defensive mode, but it is unable to provide a comfortable solution; (3) the individual shows a defensive mode that provides a comfortable solution" (p. 75).

None of the boys in this study fit into the third category. Subjects 2 and 15 were diagnosed as phobic neuroses with chronic tension and apprehension. Subjects 3, 6 and 8 fit the GAP category of psychoneurotic disorder, anxiety type characterized by intense free-floating anxiety. Agitation, distractibility and overtalkativeness have been identified by Fenichel (1945) and others (Schaefer, 1948) as correlates of anxiety. Boys 4 and 7 were classified as neurotically depressed and there was also a strong depressive component in Cases 1 and 12. Finding depression in 25% of our cases was not too surprising since depression is a common outcome of hyperactivity in adolescence, Malmquist (1972) suggests that "depressive phenomena in the latency age group are often ignored. The occurrence of such phenomena in this group is more frequent than is usually realized." Activity is one way to ward off depressive feelings (Storr, 1969; Malmquist, 1972).

Subjects 11 and 12 fell into the personality disorder category, rather than the neurotic group. More

specifically they were diagnosed as tension discharge disorders, neurotic personality type. Their antisocial, destructive expression of agressive impulses are essentially ego syntonic and non-distressing. But the addition of hyperactivity to the presenting picture indicated the possible intrusion of neurotic anxiety or depression into the basic personality picture. This was confirmed by projective testing.

Moving down the pathological continuum we encountered 3 borderline psychotic (1, 9, 10) and 3 psychotic children (5, 13, 14). Pine (1974) suggests that these two categories, in principle, blend into one another, and the critical feature is that "ego malfunction in them includes disturbances in the sense of reality and at times in reality testing, as well as a failure in the development of signal anxiety so that unpleasant affect readily escalates to panic instead of triggering defensive operations." It is our hypothesis that hyperactivity in these boys is a motoric manifestation of the panic and anxiety.

In terms of the model presented above, each of our subjects showed relatively intense psychological unrest (anxiety, anger, frustration and depression) and ego coping mechanisms not strong enough to allow a comfortable resolution of the tension.

The question arises, at this point, whether the anxiety, anger and depression might be sequels to some cerebral dysfunction, similar to the catastrophic reaction shown by some brain damaged adults. There is, of course, no way to answer this question definitively. Six of our subjects, however, showed no evidence of cerebral dysfunction on neuropsychological testing. Subjects 7 and 12 were also 100% asymptomatic on EEG and pediatric neurological examination. While in Chapter I brain damage was shown not to be a sufficient condition for hyperactivity, this evidence shows that it is not a necessary condition either.

In the 9 cases where there was some evidence of cerebral dysfunction, it seems pointless to try to decide between a totally organic or a totally functional etiology. Rather, it is more useful to think of the impairments as having interacted with the personality structure of the child and environmental factors to produce a hyperactive child.

CHAPTER V

SOME CONCLUDING REMARKS

Hyperactivity is not a discrete clinical entity. It is only a symptom. However, it is a symptom for which almost one million children in this country are receiving daily dosages of stimulant medication. For this reason alone it merits intensive study. We have proposed an interactional model which hopefully will serve as a suitable framework for such study. It is essentially an ego psychological model which involves internal structures necessary for voluntary control of behavior. When these structures are weak or overstressed hyperactivity can result. We have hypothesized several sources of such stress: anxiety, depression, anger, and frustration.

The proposed model also suggests that no one treatment procedure is suitable for all hyperactive children. As described in Case 1, comprehensive treatment must be aimed at rehabilitating identified ego malfunctions and lessening sources of tension.

The author feels that the next step in the study of hyperactivity should involve a large scale, longitudinal evaluation and treatment program. The assessment

procedures used here proved useful but might also be expanded to include other possible sources of tension such as diet or neurophysiological malfunction. Treatment procedures fall into four major categories: (1) verbal-conceptual and verbal-mediation training; (2) the development of perceptual-analytic structuring and motor planning skills; (3) psychotherapy to enhance the ego's capacity to achieve an integrated, adaptive, responsive capacity to anxiety and to accept instinctual drives; (4) medication, if necessary, to facilitate these other procedures. Finally, follow-up into adolescence and adulthood is needed, since hyperactive boys have been shown to be a high risk for a wide variety of social and psychiatric problems in later life.

This is an ambitious project, but simple procedures have failed to handle the complex interrelationships between a number of variables within each child.

Beyond any contribution to the understanding of hyperactive children, the author hopes this study emphasizes that the understanding of one person is as legitimate a scientific enterprise as generalizing about large numbers of people with large scale statistics. Clinical psychologists are uniquely suited for such an enterprise and should recognize it more often as a suitable method to be used in the development of a truly human science.

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