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A Four-Year Follow-up of Hyperactive Boys with and without Conduct Disorder

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Summary: A four-year follow-up of clinically selected hyperactive boys with and without associated conduct disorder investigated their outcome during early adolescence and was taken from a structured behavioural interview and standard psychological testing.

Boys originally diagnosed as "purely" hyperactive continued to be inattentive and impulsive at follow-up, but showed very few aggressive and antisocial behaviours. Hyperactive boys who had earlier been undersocialized and aggressive continued to have problems with attention and impulsivity, were reported to be aggressive, noncompliant, egocentric, exhibiting antisocial behaviours and using alcohol. These findings suggest that antisocial and delinquent behaviour often reported in follow-up studies of hyperactive boys may be linked to childhood aggression and unsocialized behaviour, rather than the syndrome of hyperactivity.

Methods to identify and validate more homogeneous subgroups of childhood hyperactivity are currently in vogue. One approach has been to distinguish children who show extreme degrees of locomotor activity and inattention across many situations—pervasive hyperactivity (Campbell *et al*, 1977; Sandberg *et al*, 1978). For example, Schachar *et al* (1981) have found that children with pervasive hyperactivity (about 2 per cent of the total population in the Isle of Wight survey) differ from children with situational hyperactivity in having marked intellectual impairments, more general behavioural disturbance, and a worse prognosis.

Another method for subtyping hyperactivity has been to examine the relative contributions of hyperactivity and conduct disturbance in the aetiology and outcome of childhood behaviour disturbance (Milich and Loney, 1979; Sandberg *et al*, 1980). August and Stewart (1982), for example, have distinguished boys who are purely hyperactive from those with hyperactivity and conduct disorder on the basis of several behavioural symptoms that were not among the diagnostic criteria. While these two groups differed on clinical variables such as the presenting problems, age of onset, IQ, and prevalence of learning problems, few biological and psychosocial factors separated the groups.

If this latter diagnostic distinction is to have any clinical usefulness it must be established that the groups differ in terms other than defining criteria or cross-sectional data. One possibility is that the presence or absence of conduct disturbance predicts later outcome. Loney *et al* (1978), for example, found in a follow-up study of hyperactive children that a child's aggressiveness was a significant predictor of aggressive and delinquent behaviour in adolescence, while the level of activity was a weak predictor only of school achievement. These data argue that childhood aggression and under-socialization, rather than the syndrome of childhood hyperactivity, are linked to the development of antisocial and delinquent behaviour. If this idea is true, we would expect that boys with pure hyperactivity will have a more favourable adolescent outcome, while the hyperactive-unsocialized aggressive boys will continue to have severe behavioural and socialization problems.

The purpose of the present study was to follow-up those boys diagnosed by August and Stewart (1982) as pure hyperactive or hyperactive with aggressive conduct disorder to determine their psychiatric state approximately four years after their original clinical evaluation.

Method

Subjects

The follow-up study began by retrieving the records of the 34 pure hyperactive (H) boys and the 42 hyperactive-unsocialized aggressive (H-USA) boys described by August and Stewart (1982). We mailed letters and later made phone calls to the parents of

these boys, in which we explained the purpose of the study and asked if they would agree to be interviewed. Fifty-two of the original 76 were recruited for the follow-up; 22 (H), and 30 (H-USA). Of the 12 H boys who were "lost", nine families could not be traced, and the other three sets of parents refused to be interviewed. Twelve H-USA boys could not be followed-up. Seven of their families could not be found and five refused to be interviewed. However, the initial and follow-up samples were very similar in terms of age, intelligence, social class, and original ratings for hyperactivity and conduct disturbance (Table I).

Procedure

A home visit was scheduled with each family, in which a specifically trained clinical psychologist conducted a structured interview with the mother and/or father of the proband. The interviewer was blind to the histories and original diagnoses of the subjects. The structured interview included four sections: questions to define the age of onset (5 items); a clinical assessment rating form (70 items); the chief concerns of the mother; and questions about the parent's marriage, conflict in the home, and times when the child was separated from the parents (9 items). This interview is similar in format to that developed and tested by Stewart and his colleagues (DeBlois and Stewart, 1980; Stewart *et al*, 1981).

The clinical assessment form yields data on a wide range of childhood emotional and behavioural symptoms. Almost all of the symptoms are covered by questions which pose three alternatives to the informant. For example, the question on fighting is, "when it comes to fights with other children at school or in the neighbourhood, would you say that your son tends to avoid fights, that he gets into as many as the average boy his age, or that he is involved in many more than most boys?" If the informant selects one of the deviant alternatives the interviewer asks for an explanation of how much of a problem the behaviour is, what relatives and friends say about it, and how it affects the child's social life and that of the family. The interviewer rates the item as deviant if the mother provides evidence that there has been a definite and persistent problem over the past year. A detailed description of the reliability of this procedure is provided elsewhere (Stewart *et al*, 1980).

Individual dimensions of behavioural disturbance have been derived from the symptoms included in the clinical assessment form (DeBois and Stewart, 1980). Six dimensions were originally constructed on the basis of a principal component factor analysis on 54 of the 70 items. Six factors were elicited which had Eigen values greater than 1.7 These factors explained 72.5 per cent of the total variance and they represented the following dimensions: noncompliance, reactivity, aggressiveness, antisocial behaviour, depression and anxiety. In addition to these six dimensions, three new dimensions (overactivity, inattention, inadequate social relations) have been subsequently constructed from additional items.

Each dimension consists of five of the individual items covered in the clinical assessment form (Table II). Scores were computed from the subjects' rating (1,

TABLE I

Characteristics of original and follow-up samples

	Hyperactive		Hyperactive, unsocialized and aggressive	
	Mean	SD	Mean	SD
Original sample				
Age at intake	10.7	2.3	9.3	3.1
WISC-R fullscale IQ	92.4	18.1	96.7	14.7
Social class*	3.9	0.7	4.0	0.3
Hyperactivity source ratings**	5.2	0.6	5.1	0.8
Conduct disturbance source ratings	1.3	0.7	4.5	0.7
Follow-up sample				
Age at intake	10.7	1.9	9.6	2.5
Age at follow-up	14.2	2.2	13.7	2.3
WISC-R fullscale IQ	97.9	14.1	102.5	13.2
Social class	3.7	0.7	4.0	0.5
Hyperactivity source ratings	5.3	0.7	5.1	0.8
Conduct disturbance	1.1	0.6	4.8	0.9

*Based on the Hollingshead and Redlich Scale.

**Six sources were used to establish criteria for research diagnoses. A subject's score for the behavioural dimension reflects the numbers of sources which supported the presence of the problem.

TABLE II
Dimension items

Inattention	*Egocentricity*
Distractible	Excessive need for attention
Doesn't finish projects	Projects blame
Doesn't seem to listen	Problems sharing
Difficulty concentrating	Insensitive to others' feelings
Difficulty sticking to a play activity	Lack of repentance
Reactivity	*Antisocial Behaviour*
Impatient	Lies
Impulsive	Steals at home
Reckless	Steals outside home
Easily upset	Fire setting
Excitable	Vandalism
Overactivity	*Inadequate Social Relations*
High energy level	Difficulty making friends
Loud and rowdy	Difficulty keeping friends
Difficulty sitting still	Shows off in front of other children
Runs about or climbs on things too much	Prefers doing things by himself
Difficulty going to sleep	Excluded from neighbourhood activities
Aggression	*Noncompliance*
Fights with peers	Ignores directions
Attacks adults	Resents discipline
Shouts at parents	Oppositional
Extremely competitive	Stays out late
Quarrels with peers	Lacks respect for adults

3, 5) on each item in a given dimension (1 = much less than average for a boy at the subject's age; 3 = the average range; 5 = more than average). Virtually all deviant behaviours described by the informants in the present study were in the direction of occurring "more than average." Based on this truncated scoring continuum, we decided to set a score of 15 on each dimension as indicative of normal behaviour and a score of 25 as completely deviant. A cutoff score of 19 or more (i.e. two or more items out of five for a given dimension were rated deviant in the positive direction) was taken as the criterion for deviance on that dimension. This cutoff score was determined on the basis of previous research which indicated that dimension scores of 19 or higher clearly differentiated conduct disordered children from clinical controls (Stewart *et al*, 1980).

The majority of the subjects had not been on medication during the year prior to the follow-up. In several cases where a child was still taking medication the interviewer requested that the informant address the questions with respect to drug-free periods.

Following the interview with the parent each boy was administered a short battery of academic achievement tests, including the Wide Range Achievement Tests and the Reading Comprehension subtest of the Stanford Diagnostic Reading Inventory. Intelligence test data reported in this paper were collected at the initial evaluation using the WISC-R.

Follow-up diagnosis

In addition to assessing the individual dimensions of behaviour disturbance, we decided to determine how many of the boys would satisfy research criteria for pertinent DSM-III diagnoses at follow-up. The following DSM-III diagnostic categories were utilized:

(i) attentional deficit disorder (with or without hyperactivity);
(ii) conduct disorder (undersocialized or socialized, aggressive or nonaggressive);
(iii) specific developmental disorder (reading and/or spelling).

The behavioural diagnoses were based on deviant dimension scores on the structured behavioural interview. For example, ADD was diagnosed on the basis of deviant scores on both inattention and reactivity dimensions of the interview, while the diagnosis of hyperactivity was assessed by a deviant score on the overactivity dimension. Undersocialized conduct disorder was based on deviant ratings from at least two of the following three dimensions (antisocial behaviour, egocentricity, inadequate social relations), while aggressive conduct disorder was diagnosed from deviant scores for both aggression and noncompliance. Specific developmental disorders involving reading and/or spelling were assessed on the bases of achievement scores two grade levels below age-appropriate grade, or a disparity between verbal and performance IQ scores exceeding 20 points.

Results

Dimension scores

The means and standard deviations for the 22 H and 30 H-USA boys are displayed in Table III. Taking a score of 19 or more as deviant for a specific dimension, both subgroups showed considerable deviancy on the core components of the hyperactive child syndrome (e.g. overactivity, inattention, reactivity). The degree of deviancy was less for the conduct disturbance dimensions; nevertheless, the H-USA boys were rated more deviant as a group on the noncompliance, aggression, and egocentricity dimensions and also showed more intra-group scatter on these dimensions.

Individual items of conduct disturbance

The groups were also compared on a series of individual items which were taken from Robins (1966) list of antisocial behaviours with minor changes. Each

TABLE III
Dimension scores of hyperactive subgroups at follow-up

Dimension	Hyperactive (n = 22)	Hyperactive, unsocialized and aggressive (n = 30)	t-values
Overactivity	20.37±2.78	20.65±2.11	t = .40
Inattention	22.18±1.95	20.40±2.47	t = 2.91**
Reactivity	21.30±3.75	22.12±2.93	t = .85
Noncompliance	16.38±2.97	18.92±3.70	t = 2.76**
Aggression	14.15±2.51	18.40±3.10	t = 4.01**
Antisocial behaviour	13.53±4.01	14.84±4.52	t = 1.11
Egocentricity	15.23±2.89	17.14±3.06	t = 2.35*
Inadequate social relations	16.46±3.85	18.20±4.23	t = 1.54

**P <.01; *P <.05

TABLE IV
Individual items of conduct disturbance at follow-up

Behaviours	Hyperactive (n = 22)		Hyperactive unsocialized and aggression (n = 30)		P
	n*	%**	n	%	
Reckless	9	(41)	18	(60)	N.S.
Quick temper	9	(41)	23	(77)	<.01
Quarrelsome	5	(23)	21	(70)	<.001
Physical aggression	0	(0)	10	(32)	<.001†
Disrespectful	13	(59)	16	(53)	N.S.
Irresponsible	7	(32)	16	(53)	<.05
Lacks guilt	2	(9)	11	(37)	<.05
Vengeful	2	(9)	11	(37)	<.05
Cruelty	0	(0)	5	(17)	<.05†
Disloyal	2	(9)	10	(33)	<.05
Shouts at, or abuses adults	9	(41)	12	(40)	N.S.
Runs with bad crowd	2	(9)	5	(17)	N.S.
Thefts	2	(9)	4	(13)	N.S.
Fire setting	2	(9)	6	(20)	N.S.
Damages property	4	(18)	9	(30)	N.S.
Vandalism	0	(0)	3	(10)	N.S.
Alcohol and/or drug abuse	0	(0)	9	(30)	<.004†
Truancy	4	(18)	3	(10)	N.S.
Trouble with police	4	(18)	7	(23)	N.S.

* = number of subjects with deviancy
** = percentage of subjects with deviancy
† = Fisher Exact Probability Test; all other comparisons performed with χ^2 test

subject was assigned a score which was the number of deviant items on the list which he was reported to have shown over the previous year. As shown in Table IV the H-USA boys had a significantly higher proportion of individual conduct-related disturbances as compared with their H counterparts.

Follow-up DSM-III diagnoses

The follow-up diagnoses for the hyperactive subgroups are summarized in Table V. Nineteen of 22 (86 per cent) pure hyperactive boys were diagnosed with ADD at follow-up. Of these, 12 were also hyperactive, while 7 were not. Among the H-USA subgroup, there were 25 boys of 30 (83 per cent) who also received the diagnosis of ADD, only one of whom was not hyperactive. It may be concluded that two of the core symptoms of the hyperactive child syndrome (e.g. inattention and impulsivity) remained relatively stable in both subgroups over the four year period, while overactivity appeared to diminish as a major problem for the pure hyperactive children.

No pure hyperactive boy received the additional

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TABLE V
Follow-up diagnosis

	Attention deficit disorder		Conduct disorder		Specific developmental disorder
	Hyperactive	Not hyperactive	Under-socialized conduct disorder	Socialized conduct disorder	Reading or spelling
Hyperactive (n = 22)	12	7	0	0	3
Hyperactive, unsocialized and aggressive (n = 30)	24	1	8	3	4

diagnosis of conduct disorder. In contrast, 11 (37 per cent) of the H-USA boys met criteria for conduct disorder. The difference in the prevalence of conduct disorder between the two groups was statistically significant, $\chi^2 = 10.23$, $P < .01$.

Three of the pure hyperactive boys had a specific developmental disorder involving reading and/or spelling, each of whom had a primary follow-up diagnosis of ADD. There were 2 H-USA boys who also showed developmental reading problems and 4 with developmental spelling problems. Each of these six boys, received a follow-up diagnosis of ADD-H, but only one received the additional diagnosis of conduct disorder.

Discussion

Most follow-up studies of hyperactive children (Mendelson *et al,* 1971; Minde *et al,* 1971; Huessy *et al,* 1974; Riddle and Rapoport, 1976; Campbell *et al,* 1977) have shown that a significant proportion of the subjects continue to show problems in their attention, learning and social behaviour as they enter adolescence and adulthood. Moreover, the rate of delinquency among a large group of ADD boys at follow-up, has recently been reported to be as high as 58 per cent, a percentage which did not significantly differ across socio-economic levels (Satterfield *et al,* 1982). This finding suggests a strong relationship between childhood ADD and delinquent behaviour. A shortcoming shared by all such studies is the heterogeneity with their samples. They have included children with a wide range of problems, learning difficulties, environmental disadvantages, and neurological abnormalities. Thus, it is impossible to draw conclusions about the issue of whether the primary symptoms of childhood hyperactivity (inattention and overactivity) predict later psychiatric or social handicap, or whether other factors such as low IQ, specific learning disability, and conduct disturbance have more influence.

In the present study, children rigourously diagnosed as pure hyperactive, showed little evidence of aggressive and/or antisocial behaviours at follow-up. Although inattention and impulsivity continued to be significant problems, these boys were rated as being less overactive as a group than they had been in middle childhood. Hyperactive boys who had earlier been aggressive and undersocialized continued to be inattentive, impulsive, and overactive, and a significant proportion of them continued to have conduct disturbance. In fact, using conservative diagnostic criteria, we were able to diagnose 37 per cent of these boys with a major aggressive conduct disorder. The conduct problems which were reported clustered into two categories. One involved quick temper, aggressiveness, quarrelsomeness, vengefulness and cruelty. The other consisted of irresponsibility, lack of guilt and disloyalty. In addition, a significant number of these boys were reported by their parents to be using alcohol. This latter finding is particularly alarming in light of studies by Nylander (1979) and Kellam *et al* (1980), both of which show that early aggressiveness in boys is a strong predictor of alcohol abuse late in teens or early in adult life.

In general, our findings show that hyperactive behaviours in childhood do not necessarily lead to major behaviour problems in adolescence. Inattention and impulsivity remain relatively stable cognitive styles over time. It seems, however, that the antisocial and delinquent behaviours observed in adolescence depend more on the early presence of aggressive, under-socialized conduct disturbance than on the hyperactive components of inattention and overactivity. Interestingly, Schacher *et al* (1981) found quite the opposite results, in that poor outcome was associated with a child's hyperactivity, especially if it was pervasive, rather than with conduct disturbance per se. This latter finding is particularly puzzling in light of the numerous reports showing poor outcome of children with conduct disorders (Graham and Rutter, 1973; Robins, 1978; Loney *et al,* 1978; Olweus, 1979;

Mitchell and Rosa, 1981). Clearly, there are methodological differences among these studies in the criteria used for diagnosing hyperactivity as well as the variables employed to assess outcome. Continued research is necessary to clarify the specific contributions of the various components of the hyperkinetic syndrome as they pertain to outcome. Moreover, it is equally important to examine the interactions between these clinical components, socio-economic status, cognitive functioning and treatment modality.

There are now converging lines of evidence which put in doubt the validity of a hyperactive child syndrome. The most important of these is the apparent non-specific nature of the cardinal features of the putative syndrome, i.e., inattention and overactivity. British investigators, for example, have reported that measured ratings of hyperactivity, in both clinic attenders as well as school children, have little association with any possible aetiological variable (Sandberg *et al,* 1978; Sandberg *et al,* 1980), while studies in the U.S. indicate that sociopathy and alcoholism in the parents of hyperactive boys are associated with the boys' conduct disturbance rather than with their hyperactivity (Stewart *et al,* 1980).

In summary, our findings are additional evidence that there are at least two types of hyperactive children in a clinic sample from which brain damaged, mentally retarded, and psychotic children have been excluded. The boys in one group present a clear picture of aggressive conduct disorder during childhood (August and Stewart, 1982), have parents with a serious personality disorder or alcoholism (Stewart *et al,* 1980), and tend to continue to be over-aggressive and antisocial as young adolescents. These are the hyperactive boys who are personally at high risk for later delinquency. On the other hand, there are hyperactive boys who show few if any signs of conduct disturbance, who have a relatively higher prevalence of cognitive problems (August and Stewart, 1982), whose parents are relatively free of psychopathology (Stewart *et al,* 1980), and who show few signs of behavioural deviance at follow-up beyond their difficulties with attention and impulsivity. From a practical point of view, we believe that the two groups need different types of treatment. Those with conduct disorder may respond well to training in social skills (Oden and Asher, 1977), and in controlling impulsive behaviour (Douglas *et al,* 1976). Those without conduct disorder need special educational programs and may benefit from stimulant medication.

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