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## Childhood Identification and Prophylaxis of Antisocial Personality Disorder

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**ABSTRACT:** Physiological and psychological characteristics show considerable similarity between children with attention deficit disorder with hyperactivity (ADDH) and adults with antisocial personality disorder (ASPD). Prospective studies of ADDH children, with or without conduct disorder (CD), show a high outcome of ASPD. Recently, other forms of treatment have been added to the traditional psychopharmacological agents used for ADDH. If medication and new treatment modalities are administered for a period of three years, a recent controlled study indicates that the mean number of arrests for felony offenses and the mean number of institutionalizations are reduced at a  $p < 0.0001$  level (1.32 versus 0.19 and 0.49 versus 0.00, respectively).

**KEYWORDS:** psychiatry, children, mental illness, attention deficit disorder with hyperactivity, antisocial personality disorder

### Physiological Similarities Between Attention Deficit Disorder with Hyperactivity (ADDH) and Antisocial Personality Disorder (ASPD)

James Satterfield was probably the first to show the physiological similarity between ADDH children and ASPD adults in 1978 [1]. These physiological factors have recently been described by Mednick and Volavka [2]. In both ADDH and sociopaths, there is a low autonomic nervous system (ANS) and central nervous system (CNS) activity, indicated by:

There is a low autonomic nervous system (ANS) and central nervous system (CNS) activity, indicated by:

1. Electroencephalogram (EEG) slow waves are increased (alpha and theta). This has been confirmed for both sociopaths and ADDH children by power spectrum analysis of the EEG.
2. Skin conductance is decreased.
3. Spontaneous fluctuations of skin conductance before an aversive stimulus are dampened.
4. The skin conductance response to strong stimuli is greatly reduced.
5. ANS and CNS activity are increased with the administration of amphetamines or derivatives in both conditions, including inhibitory action potentials.
6. Catecholamine levels showed no increase in psychopathic men just before trial,

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whereas normals showed highly elevated catecholamine levels in the same situation [2]. (See Item 5 in following section on **Psychological Similarities.**)

Solanto [3] has suggested that the effect of psychostimulants on ADDH children is to activate dopamine autoreceptors (inhibitory) consistent with the theory elsewhere proposed that there is a deficiency of catecholamine transfer at the synaptic junction, leading to hypersensitivity of postsynaptic receptors.

In summary, there are comparable biological abnormalities in both ADDH and ASPD that can explain a number of similar psychological characteristics of these two groups of individuals.

### **Psychological Similarities**

Elliott [4] has described a number of psychological characteristics of sociopathic individuals that are also typical of ADDH children:

- (1) lack of foresight,
- (2) lack of insight,
- (3) defective affect,
- (4) inability to learn from experience,
- (5) diminished sense of fear,
- (6) inadequate motivation,
- (7) poor judgment,
- (8) absence of depression and neurotic anxiety (ADDH children may show dysphoria and some depressed children may show symptoms of hyperactivity that respond to antidepressant medication; typical ADDH patients are neither depressed nor anxious),
- (9) frequent lies and inability to distinguish fantasies from reality, and
- (10) self-defeating pattern of behavior (there is a high covariance of ADD and aggression as shown by Shapiro and Garfinkel [5] and Trites & Laprade [6]).

Mednick and Volavka [2] have also pointed out that the search for excitement (including violence) in sociopaths is a way of increasing ANS and CNS activity. Hyperactive children show a similar disregard for prudence and caution, and their behavior is both reckless and feckless. Not mentioned in any specific reference is the externalization of blame by both ADDH and ASPD individuals. ADDH children frequently provoke fights with peers, get poor grades, and annoy their mothers. They usually say it is the fault of the other child, the teacher, or the mother when confronted with the unacceptability of their behavior. Similarly, a sociopathic person who steals a car to get to his destination will tend to say that he did nothing wrong, it was the fault of the automobile's owner who left his keys in the car, and besides, he had to get to where he was going.

### **Nosology**

Table 1 describes the research diagnostic criteria (RDC) for hyperactivity/attention disorder [7]. The RDC in Table 1 represent a consensus of a group of experts in this disorder who met for that specific purpose in Groningen, The Netherlands, in 1985. Social disorders characterizing hyperactivity/attention disorder were a matter of considerable discussion but declined by the majority of experts for inclusion in the RDC. For the purpose of this paper, the following unpublished criteria that emanated from the Symposium are reproduced in Table 2.

Research criteria require input from various sources as indicated in Fig. 1 from Sergeant [7].

TABLE 1—*Hyperactivity/attention disorder.*<sup>a</sup>

- 
1. Activity disorder:
    - A. motor restlessness, for example, XS running, jumping, climbing, fidgeting, squirming when seated
    - B. cannot remain seated when required
    - C. talkative, intrusive, noisy, interfering
    - D. rapidly shifts from one activity to another
  2. Attention disorder:
    - A. easily distracted
    - B. inability to organize, for example, does not complete tasks, difficulty developing strategies for complex tasks
    - C. impulsivity, for example, immediately answers questions rather than listening and thinking; cannot remain within guidelines, pursues immediate gratification; avidly seeks reward
    - D. difficulty in shifting from one directed activity to another
- 

<sup>a</sup>Reprinted with permission from J. A. Sergeant, "RDC for Hyperactivity/Attention Disorder," in *Attention Deficit Disorder: Volume V*, L. M. Bloomingdale and J. A. Sergeant, Eds., Pergamon Books Ltd., in press.

TABLE 2—*Social disorders.*<sup>a</sup>

- 
1. Does not respond to punishment
  2. Insensitive to feelings and needs of others; oblivious to the effect of own behavior, verbal and non-verbal, on others;
  3. Cannot wait for turn: jabs, punches, shoves and provokes other children
  4. Controlling of peers and adults (parents), cannot tolerate direction, orders, authority
- 

<sup>a</sup>Author's unpublished insertion.

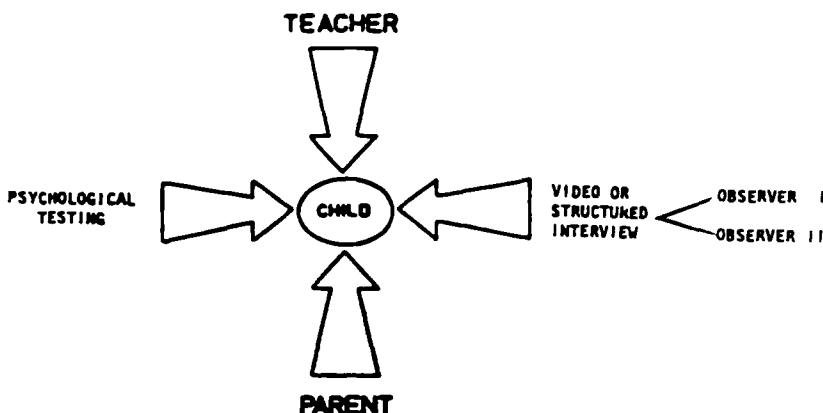


FIG. 1—*Cross-situational comparisons used to select ADDH subjects (reprinted with permission from J. A. Sergeant, "RDC for Hyperactivity/Attention Disorder," in Attention Deficit Disorder, Volume V, L. M. Bloomingdale and J. A. Sergeant, Eds., Pergamon Books Ltd., in press).*

**Course**

The usual course of development from ADDH to ASPD is the chronological development of the ADDH child to oppositional disorder (OD), then unsocialized conduct disorder, delinquency, and, after the age of 18, ASPD.

The criteria for OD from *DSM-III-R in Development* [8] appear in Table 3. A simpler form of the oppositional phase from an unpublished paper by C. Edelbrock and R. Loeber appears in Table 4.<sup>2</sup> Unsocialized conduct disorder is reproduced from an unpublished presentation in Table 5.

There is a considerable covariance between ADDH and conduct disorder. This overlap was found by Trites [6] in his study of 14 000 school children as percentage of subfactors of the Conners Teachers Rating Scale (CTRS) (Fig. 2). Note that 5.7% of all school children had ADD and 75% of the ADD + CD combined group were afflicted by ADD (some of whom will develop CD if not already present).

Shapiro and Garfinkel [5] studied 315 school children and found a very similar percentage of hyperactivity/attention in these 315 children, namely, 5.3 and 60% of the combined cohort. Quay [9] studied conduct disorder and found that the weighted average correlation between conduct disorder and attention problems was 0.54 (Table 6).

TABLE 3—*Oppositional disorders.*<sup>a</sup>

- 
1. Often swears and uses obscene language
  2. Blames others for his mistakes; stretches reality to justify misbehavior
  3. Dominates and is mean to other children and pets (without physical cruelty)
  4. Deliberately annoys others and overreacts when annoyed by others
  5. Often argues with adults; defies or refuses adult requests or rules
- 

<sup>a</sup>Modified by author from American Psychiatric Association, *Draft DSM-III-R in Development*. Washington, DC, 5 Oct. 1985.

TABLE 4—*Oppositional disorder. brief form.*<sup>a</sup>

- 
- Argues
  - Bragging
  - Demands attention
  - Disobeys at home
  - Temper tantrums
  - Stubborn
  - Teases
  - Loud
- 

<sup>a</sup>Modified from C. Edelbrock and R. Loeber. unpublished material.

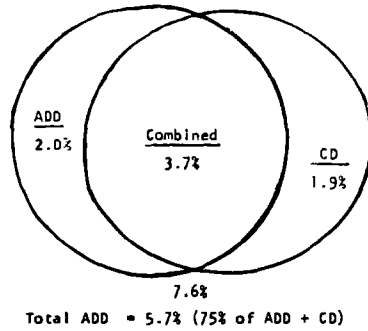
TABLE 5—*Unsocialized conduct disorder.*<sup>a</sup>

- 
1. Fighting; hitting; assaultive; destructive
  2. Untrustworthy; dishonest; cheats; lies
  3. Actively disliked by peers
  4. Not considered present until age 7 or diagnosed after age 17
- 

<sup>a</sup>Proposed by John Werry. Modified from personal communication, 1985.

<sup>2</sup>C. Edelbrock and R. Loeber, unpublished material.

TRITES: > 14,000 SCHOOL CHILDREN IN OTTAWA  
 PERCENTAGES ON SUBFACTORS OF CONNERS TRS



SHAPIRO AND GARFINKEL: 315 SCHOOL CHILDREN IN MINNESOTA

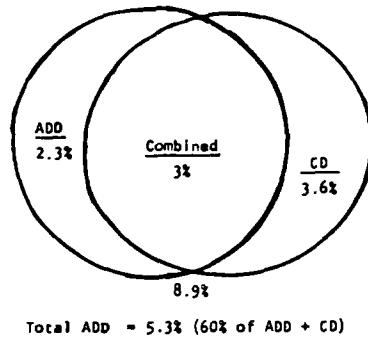


FIG. 2—Venn diagrams of ADD · CD: (top) Trites: >14 000 school children in Ottawa percentages on subfactors of CTRS (adapted from R. L. Trites and K. Laprade, "Evidence for an Independent Syndrome of Hyperactivity," *Journal of Child Psychology and Psychiatry*, Vol. 24, No. 4, 1983, pp. 573-586) and (bottom) Shapiro and Garfinkel: 315 school children in Minnesota (adapted from S. K. Shapiro and B. D. Garfinkel, "The Occurrence of Behavior Disorders in Children: The Interdependence of Attention Deficit Disorder and Conduct Disorder," *Journal of the American Academy of Child Psychiatry*, Vol. 25, No. 6, 1986, pp. 809-819).

The dynamics of development of OD and CD from ADDH children is well demonstrated in Fig. 3 [10]. Barkley has developed a powerful series of interviews with parents and ADDH children to interrupt the cycle indicated in his diagram. We have used his method and found it to be highly effective but requiring considerable reinforcement over a period of time, particularly if the child attends a school where the teachers are uninterested in working with a therapist.

**Prospective Studies**

Note from Table 7 that the first American Psychiatric Association (APA) *DSM-III* criterion for antisocial personality disorder is, "Evidence of conduct disorder before 18" [11]. The percentage of children with CD who develop ASPD is not known.

TABLE 6—*Intercorrelations among the subscales of the Revised Behavior Problem Checklist (RBPC).*<sup>a</sup>

| Conduct Disorder  |                    |                                  |
|-------------------|--------------------|----------------------------------|
| Samples           | Attention Problems |                                  |
| 1                 | 0.56               | 505 (random)                     |
| 2                 | 0.51               | 136 (gifted)                     |
| 3                 | 0.49               | 34 (problem children)            |
| 4                 | 0.51               | 151 (inpatient rated by staff)   |
| 5                 | 0.55               | 100 (inpatient rated by parents) |
| 6                 | 0.45               | 50 (outpatients with tutors)     |
| Weighted average: | 0.54               |                                  |

<sup>a</sup>Reprinted with permission from H. Quay, "Aggression, Conduct Disorder, and Attention Problems," in *Attention Deficit Disorder: Identification, Course and Rationale*, L. M. Bloomington, Ed., Spectrum, New York, 1985, p. 37 (distributed by PMA Publishing Corp.).

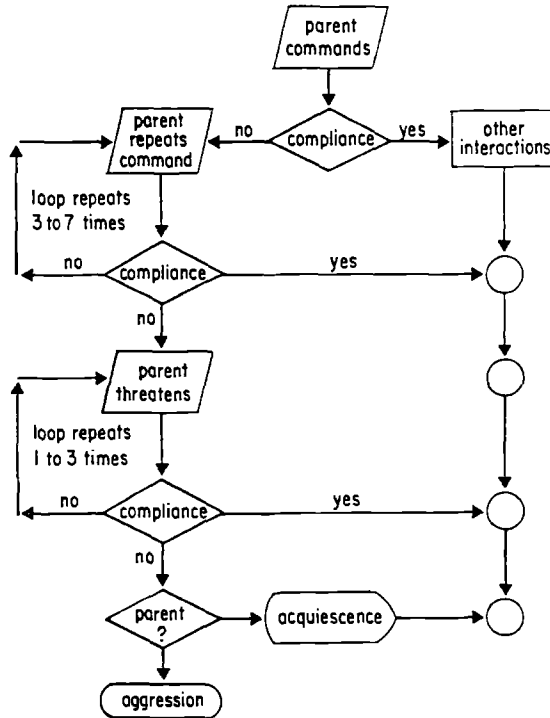


FIG. 3—Vicious cycle in parent-child interaction in ADD → OD, CD, and ASPD (reprinted with permission from R. A. Barkley, *A Manual for Training Parents of Behavior Problem Children*, Guilford Press, New York, 1981, p. 3).

TABLE 7—*Antisocial personality disorder.*<sup>a</sup>

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A. Current age at least 18

B. Evidence of conduct disorder before age 18 as indicated by following symptoms before 15:

1. truancy; expulsion; several suspensions
2. lies consistently; steals; vandalizes
3. repeatedly initiates fights
4. voluntary sexual intercourse; smokes; drinks; other illicit drugs before usually for general subculture

C. Irresponsible and antisocial behavior:

1. irregular work or school attendance
2. walks off jobs; voluntary unemployment
3. unlawful behavior (whether arrested or not): destroying property, harassing others, stealing, illegal occupation, assault and battery, rape
4. impulsive; does not plan ahead; wanders around country aimlessly; reckless (driving while intoxicated, recurrent speeding)
5. promiscuous; poor parent (inadequate child nutrition, medical care, and so forth)
6. lack of remorse (feels justified in having hurt, mistreated or stolen from another)

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<sup>a</sup>Modified by author from American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders* (third edition), Washington, DC, 1980.

It appears from prospective studies [12-15] that ADDH children psychopharmacologically treated showed 18 to 45% ASPD on follow-up. Many may have developed it subsequently. The ASPD adults all exhibited CD because of the criteria promulgated in *DSM-III* and *DSM-III-R in Development*. How many of them had ADDH is not known, but Quay's statistics in Table 7 would indicate that over 50% did have ADD.

Interesting data were found by Lee Robins [16] in a multicenter study as indicated in Tables 8 and 9. Tables 10 and 11 are data from Satterfield [1] that are relevant to the questions raised.

Weiss and Hechtman [15] found in their sample of ADDH children, followed for 15 years, that 1 or 2% of controls and 14 to 23% of hyperactives met modified Schedule for Affective Disorders and Schizophrenia (SADS) or *DSM-III* criteria for antisocial personality disorder ( $p < 0.01$ ). They point out that this was significantly less than Loney found in her sample, where 45% of the hyperactives and 18% of their brothers met modified SADS criteria for antisocial personalities [14]. They found that "Most importantly the severity of antisocial behavior was significantly greater with the hyperactive group." Satterfield et al. [17] found a significant difference between ADD children and their brothers, as shown in Table 12. They

TABLE 8—*Risk of children with three or more conduct problems developing antisocial personality (St. Louis only).*<sup>a</sup>

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| Age-Group | Percent with Antisocial Personality |       |
|-----------|-------------------------------------|-------|
|           | Men                                 | Women |
| 18-29     | 40                                  | 24    |
| 30-49     | 48                                  | 26    |
| 50+       | 22                                  | 22    |

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<sup>a</sup>Reprinted with permission from L. N. Robins, "Epidemiology of Antisocial Personality," in *Psychiatry, Volume 3*, R. Michels, et al., Eds., J. B. Lippincott Co., Philadelphia, 1986, Chap. 19, p. 12.

TABLE 9—*The age at initiation of conduct problems before age 15 (Epidemiological Catchment Area [ECA] data).<sup>a</sup>*

| Problems in Order of Occurrence | Mean Age at Initiation Before 15 |       |
|---------------------------------|----------------------------------|-------|
|                                 | Men                              | Women |
| School discipline               | 9.0                              | 9.8   |
| Underachievement                | 9.3                              | 10.2  |
| Fighting                        | 9.4                              | 10.0  |
| Lying                           | 9.9                              | 9.6   |
| Stealing                        | 10.0                             | 9.7   |
| Truant                          | 11.0                             | 12.0  |
| Vandalism                       | 11.2                             | 10.7  |
| Drunk                           | 11.2                             | 11.8  |
| Runaway                         | 11.6                             | 12.3  |
| Sex                             | 11.7                             | 13.0  |
| Expelled                        | 11.8                             | 12.1  |
| Arrest                          | 12.4                             | 12.6  |
| Drugs                           | 12.7                             | 13.1  |

<sup>a</sup> $r = 0.87$ ;  $z = 3.01$ . Reprinted with permission from L. N. Robins, "Epidemiology of Antisocial Personality," in *Psychiatry*. Volume 3, R. Michels, et al., Eds., J. B. Lippincott Co., 1986, Chap. 19, p. 11.

TABLE 10—*Symptoms of hyperactive children (HAC) and children in adulthood diagnosed as psychopaths.<sup>a</sup>*

| Childhood Symptoms Significantly Related to Adult Psychopathy <sup>b</sup> | Those Showing Symptom as Children Later Diagnosed Psychopathic to Personality, <sup>b</sup><br>% | Adult Psychopaths Who Had Symptom in Childhood, <sup>b</sup><br>% | Hyperactive Children Showing Symptom |                                |
|--|--|---|--------------------------------------|--------------------------------|
|  |  |   | Young HAC, <sup>c</sup><br>%         | Teenage HAC, <sup>d</sup><br>% |
| Pathological lying   | 39   | 26  | 43                                   | 83                             |
| Lack of guilt  | 38   | 32  | ...                                  | ...                            |
| Sexual perversion  | 37   | 13  | ...                                  | ...                            |
| Impulsive  | 35   | 38  | 59                                   | 84                             |
| Truant   | 34   | 66  | ...                                  | ...                            |
| Runaway  | 33   | 65  | ...                                  | 18                             |
| Physical aggression  | 32   | 44  | 59                                   | 13                             |
| Premarital intercourse   | 31   | 28  | ...                                  | ...                            |
| Theft  | 31   | 83  | 27                                   | 66                             |
| Incorrigible   | 30   | 80  | 57                                   | 83                             |
| Stays out late   | 30   | 54  | ...                                  | ...                            |
| Bad associates   | 30   | 56  | ...                                  | ...                            |
| Reckless   | 29   | 35  | 49                                   | 22                             |
| Slovenly   | 34   | 32  | ...                                  | ...                            |
| Enuresis   | 29   | 32  | 43                                   | 13                             |

<sup>a</sup>From J. H. Satterfield, "The Hyperactive Child Syndrome: A Precursor of Adult Psychopathy?," in *Psychopathic Behavior: Approaches to Research*, R. D. Hare and D. Schalling, Eds., John Wiley, New York, 1978, p. 330. Reprinted by permission of John Wiley & Sons, Ltd.

<sup>b</sup>Data from Robins (1966); © 1966 The Williams & Wilkins Co., Baltimore.

<sup>c</sup>Data from Stewart et al. (1966).

<sup>d</sup>Data from Mendelson et al. (1971); © 1971 The Williams & Wilkins Co., Baltimore.



TABLE 11—Prevalence of childhood behavior and symptoms of hyperactive children.<sup>a</sup>

| Symptoms                                 | %   |
|--|-----|
| Contact with police                      | 59  |
| Taken to police station                  | 18  |
| Before juvenile court                    | 19  |
| Involved with police three or more times | 17  |
| Failed one or more grades                | 58  |
| Attending regular school                 | 65  |
| Special school or class                  | 27  |
| School dropout                           | 2.4 |
| State psychiatric hospital               | 2.4 |

<sup>a</sup>From J. H. Satterfield, "The Hyperactive Child Syndrome: A Precursor of Adult Psychopathy?," in *Psychopathic Behavior: Approaches to Research*, R. D. Hare and D. Schalling, Eds., John Wiley, New York, 1978, p. 331. Reprinted by permission of John Wiley & Sons, Ltd., whose data are from Mendelson et al. (1971); © 1971 The Williams & Wilkins Co., Baltimore.

TABLE 12—ADD and normal offender rates in broken and intact families.<sup>a</sup>

| Group                  | N  | Mean Age, Years | Offender Rate           |                      | Institutionalization Rate, % |
|------------------------|----|-----------------|-------------------------|----------------------|------------------------------|
|                        |    |                 | One or More Offenses, % | Multiple Offenses, % |                              |
| <b>Broken Families</b> |    |                 |                         |                      |                              |
| ADD                    | 63 | 17.3            | 48 <sup>b</sup>         | 27 <sup>b</sup>      | 30 <sup>c</sup>              |
| Normal                 | 17 | 16.9            | 18                      | 0                    | 0                            |
| <b>Intact Families</b> |    |                 |                         |                      |                              |
| ADD                    | 46 | 17.2            | 41 <sup>d</sup>         | 28 <sup>d</sup>      | 17 <sup>c</sup>              |
| Normal                 | 59 | 16.8            | 5                       | 0                    | 0                            |

<sup>a</sup>Reprinted with permission from J. H. Satterfield, B. Satterfield, A. M. Schell, and C. M. Hoppe, "Psychosocial Effects on Delinquency Rates in ADD Youths and Control Subjects—An Eight-Year Prospective Study," in *Attention Deficit Disorder: Volume III*, L. M. Bloomingdale, Ed., Pergamon Books Ltd., in press.

<sup>b</sup>*p* < 0.05.

<sup>c</sup>*p* < 0.001.

<sup>d</sup>*p* < 0.0001.

showed a more highly significant difference between ADD and normal children in their ten-year follow-up. They also found that offender rates depended, at a very high statistical level, on the type of family (broken or intact). These data are shown in Tables 13 and 14.

Satterfield et al. [12, 17] have shown the effect of multimodal treatment on the outcome of their cohorts of hyperactive children, indicating very highly significant differences (*p* < 0.0001) between patients, both in the number of arrests for felony offenses and the mean number of institutionalizations between their control group of ADD subjects treated with medication alone and those who underwent multimodal treatment for three years. Significant at the 0.01 level were the percentage of subjects treated with medication alone (control group) and those who had multimodal treatment for three years in the number of repeated arrests for felony offenses (see Table 15).

TABLE 13—Comparison of 35 ADD youths and their brothers on serious offender and institutionalization rates.<sup>a</sup>

| Group    | N  | Mean Age, Years <sup>b</sup> | Offender Rate           |                      | Institutionalization Rate, % |
|----------|----|------------------------------|-------------------------|----------------------|------------------------------|
|          |    |                              | One or More Offenses, % | Multiple Offenses, % |                              |
| ADD      | 35 | 17.6                         | 49 <sup>c</sup>         | 31 <sup>c</sup>      | 34 <sup>d</sup>              |
| Brothers | 35 | 18.0                         | 11                      | 6                    | 0                            |

<sup>a</sup>Reprinted with permission from J. H. Satterfield, B. Satterfield, A. M. Schell, and C. M. Hoppe, "Psychosocial Effects on Delinquency Rates in ADD Youths and Control Subjects—An Eight-Year Prospective Study," in L. M. Bloomingdale, Ed., *Attention Deficit Disorder: Volume III*, Pergamon Books Ltd., in press.

<sup>b</sup>Mean age in years at follow-up.

<sup>c</sup> $p < 0.01$  Fisher's Exact Test.

<sup>d</sup> $p < 0.001$  Fisher's Exact Test.

TABLE 14—ADD and normal offender rates in differing family constellations.<sup>a</sup>

| Family Type                          | N  | Mean Age, Years | Offender Rate           |                      | Institutionalization Rate, % |
|--------------------------------------|----|-----------------|-------------------------|----------------------|------------------------------|
|                                      |    |                 | One or More Offenses, % | Multiple Offenses, % |                              |
| NORMAL                               |    |                 |                         |                      |                              |
| Two biological parents               | 59 | 16.8            | 5                       | 0                    | 0                            |
| One biological parent                | 11 | 17.1            | 9                       | 0                    | 0                            |
| Stepparent and one biological parent | 5  | 16.4            | 40 <sup>b</sup>         | 0                    | 0                            |
| Stepparent (1 or 2) only             | 1  | 18.0            | 0                       | 0                    | 0                            |
| ADD                                  |    |                 |                         |                      |                              |
| Two biological parents               | 46 | 17.1            | 31                      | 18                   | 17                           |
| One biological parent                | 36 | 17.7            | 50                      | 31                   | 28                           |
| Stepparent and one biological parent | 22 | 16.9            | 55                      | 35                   | 41 <sup>c</sup>              |
| Stepparent (1 or 2) only             | 5  | 16.0            | 0                       | 0                    | 0                            |

<sup>a</sup>Reprinted with permission from J. H. Satterfield, B. Satterfield, A. M. Schell, and C. M. Hoppe, "Psychosocial Effects on Delinquency Rates in ADD Youths and Control Subjects—An Eight-Year Prospective Study," in *Attention Deficit Disorder: Volume III*, L. M. Bloomingdale, Ed., Pergamon Books Ltd., in press.

<sup>b</sup> $p < 0.05$ .

<sup>c</sup> $p < 0.07$ .

TABLE 15—Difference in offender rates between ADD and normal adolescents.<sup>a</sup>

| Group  | N   | Mean Age,<br>Years | Offender Rate              |                         | Institution-<br>alization<br>Rate, % |
|--------|-----|--------------------|----------------------------|-------------------------|--------------------------------------|
|        |     |                    | One or More<br>Offenses, % | Multiple<br>Offenses, % |                                      |
| ADD    | 110 | 17.3 <sup>b</sup>  | 45 <sup>c</sup>            | 28 <sup>c</sup>         | 25 <sup>b</sup>                      |
| Normal | 76  | 16.9               | 8                          | 0                       | 0                                    |

<sup>a</sup>Reprinted with permission from J. H. Satterfield, B. Satterfield, A. M. Schell, and C. M. Hoppe, "Psychosocial Effects on Delinquency Rates in ADD Youths and Control Subjects—An Eight-Year Prospective Study," in *Attention Deficit Disorder: Volume III*, L. M. Bloomingdale, Ed., Pergamon Books Ltd., in press.

<sup>b</sup> $p < 0.05$ .

<sup>c</sup> $p < 0.0001$ .

## Discussion

The syndrome<sup>3</sup> of attention deficit disorder, previously known as minimal brain dysfunction or hyperactivity reaction of childhood, has remained a fascinating and controversial field for study. The introduction of *DSM-III* and structured interviews have helped to discriminate these children from their peers. The research diagnostic criteria that have been formulated and *DSM-III-R in Development* both show considerable refinement on the criteria for defining this group of children. As rating scales have indicated, there is a continuum in children and a cutoff point, usually determined statistically, that is useful in differentiating ADD children from "normals." If these children are identified and given medication alone, the percentage of ASPD outcome may or may not be reduced. Recently, however, varied behavior modifications and parent training have proved to be effective over the short run. These treatments, with or without medication, given over a period of less than one year have shown a significant relapse rate. However, Satterfield's statistics [12] (see Table 16) show that three years of combined psychopharmacological and treatment of these children and their parents with individualized programs of behavior modification, educational therapy, parental and family therapy, teacher training, or whatever other interventions are indicated show highly significant and lasting improvement in outcome statistics.

It is not clear how many of Satterfield's cohort had CD and his data have not been replicated. However, Gittelman's study [13] deliberately chose a cohort of ADD children without CD. These children were treated with medication alone and showed a highly significant outcome difference in ASPD over controls.

## Conclusions

In conclusion, hyperactive children and ASPD adults show similar physiological and psychological signs and symptoms. All prospective studies of ADDH children found that significant numbers of the cohort developed ASPD. Within the last five years there has been a recognition that medication alone is insufficient for treating ADDH children and psychological modalities of treatment have been shown to be effective (although with a high rate of relapse). To avoid this contingency, it appears from data of Satterfield et al. [12] that three years of continuous treatment with medication and other modalities individually designed to meet the needs of subjects shows a highly significant decrease in statistics pertaining to ASPD (Table 16). In their 1987 paper, Satterfield et al. [12] indicated that the cost of cur-

<sup>3</sup>Depending on the definition of "syndrome," ADDH is either a syndrome or not.

TABLE 16—Comparison of delinquency outcome between the groups treated with drugs alone and the three multimodal treatment subgroups of hyperactive youths.<sup>a</sup>

| Group Characteristics or Measurements             | DTO         | MMT                      |             |                          |
|---|-------------|--------------------------|-------------|--------------------------|
|   |             | AC                       | LT          | CT                       |
| Number of subjects                                | 81          | 50                       | 24          | 26                       |
| Mean number of arrests for a felony offense       | 1.32 (2.22) | 0.54 <sup>b</sup> (1.20) | 0.92 (1.59) | 0.19 <sup>c</sup> (0.49) |
| Mean number of institutionalizations              | 0.49 (1.01) | 0.16 <sup>b</sup> (0.77) | 0.35 (1.11) | 0.00 <sup>c</sup> (0.00) |
| Percent of subjects arrested for a felony offense |             |                          |             |                          |
| One or more                                       | 43%         | 27% <sup>b</sup>         | 38%         | 15% <sup>d</sup>         |
| Two or more                                       | 28%         | 14% <sup>b</sup>         | 21%         | 3.8% <sup>d</sup>        |
| Percent of subjects institutionalized             | 22%         | 8% <sup>b</sup>          | 17%         | 0.0% <sup>d</sup>        |

<sup>a</sup>From J. H. Satterfield, B. T. Satterfield, and A. M. Schell. "Therapeutic Interventions to Prevent Delinquency in Hyperactive Boys," *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 26, No. 1, 1987, pp. 56-64. Statistical comparisons are between the drug treatment only (DTO) and the three multimodal treatment (MMT) groups (AC = all cases, LT = treated for less than 2 years, and CT = treated for 2 to 3 years).

<sup>b</sup> $p < 0.05$ .

<sup>c</sup> $p < 0.0001$ .

<sup>d</sup> $p < 0.01$ .

rent institutionalization in California is \$30 000 per year per patient, while the cost of multimodal therapy is \$3000 per year per patient. Noninstitutionalized ASPD individuals may well cost society considerably more than this tenfold estimate. Any preventive measures will greatly benefit individual patients and their putative victims. It is recommended that multimodal treatment of ADDH children be studied in a multicenter design to see if Satterfield et al.'s [12] data are replicated. If so, a national (or international) program for the decreased prevalence of ASPD by treatment, such as that described by Satterfield et al. [1] of ADDH children, should be mounted.

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