THE USE OF STIMULANT DRUGS WITH HYPERACTIVE CHILDREN

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Partial Fulfillment of Honors Program Requirements

Dr. James Van Tassel
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MEMORANDUM

Date: May 16, 1975

To: Honors Program

From: James Van Tassel, Ph.D.

Re: Susan J. Dunbar, Senior Honors Thesis

Please be advised that I have on this date reviewed Susan Dunbar's Senior Honors Thesis entitled "The Use of Stimulant Drugs with Hyperactive Children."

I hereby approve this paper for fulfillment of I.D. 499 research requirements and recommend that Miss Dunbar be awarded a grade of "A" for her efforts.
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THE USE OF STIMULANT DRUGS WITH HYPERACTIVE CHILDREN

The hyperactive child (defined by Webster as the child who is excessively or pathologically active) has become a popular topic of discussion in recent years. Professional and popular periodicals have published articles on this subject, resulting in nearly as many theories and suggestions for parents as authors who have written the articles.

While estimates range from 2% to nearly 25% of the school-aged population, Keiffer (1974) estimates that 5% of all school-aged children can be classified as hyperactive. This number will vary, depending upon each individual's criteria for determining hyperactivity.

Comly (1971) stated that the term hyperactivity is a misnomer. He preferred the term dysactivity, to indicate bad or misdirected activity, as well as the overactivity implied by the hyperactivity term. General symptoms of the condition may include overactivity, distractibility, aggressive behavior, and emotional immaturity (Walzer, 1973). Walker (1974) found these symptoms occurring more often in males than in females. The child has driven, uncontrolled behavior, short attention span, temper tantrums, difficulty sleeping, sitting
still, and responding to discipline. Solomons (1971) listed symptoms of distractibility to extraneous stimuli, very short attention span, irritability, and hyperactivity, which are manifested in emotional lability, low level of frustration, learning difficulties, visual-perceptual problems, poor performance in reading and math, and irregular handwriting. The major result of this condition is the confusion of the child; he may read or write backward, draw pictures upside-down, have concrete thinking processes, have poor short-term memory, and perseverate in his thoughts and speech (Comly, 1971).

While these behaviors are often present from birth, in some milder cases they do not appear until the child enters school. The child may have impulsive behavior, coordination problems (including fine-motor control, balance, and eye-hand coordination), may be easily distracted, show resistance to discipline, have domineering social behavior, have emotional difficulties, and show rigidity, along with a low tolerance for frustration (Wender, 1973). It must be kept in mind that some or all of these characteristics may be present in one child; no two children, hyperactive or other, are quite alike.

CAUSES OF HYPERACTIVITY

Gross and Wilson (1974) conducted longitudinal studies of over 1000 children with diagnosed hyperactive behavior and learning disabilities. They found 53.8% of
their subjects to have abnormal electroencephalogram (EEG) patterns. Some researchers have attempted to link abnormal EEG patterns with minimal brain dysfunction and hyperactivity, but have not yet found the necessary substantial research evidence. More research in brain activity is necessary before any conclusive statements can be made.

Several theories have been raised to explain the etiology of hyperactive behavior. We know that it is often present in the child who is diagnosed as having minimal brain dysfunction. Discussion of brain damage was begun after World War I, when "postencephalitic behavior disorders" were discovered (Wender, 1974, p. 72). Researchers at Johns Hopkins Hospital in Baltimore, in the 1940's and 1950's, attempted to find a relationship between prematurity and hyperactive behavior; their subjects suffered environmental disadvantages as well as prematurity, which would influence the results. Some have argued that a genetic trait is involved, because learning problems and hyperactive behavior disorders have been found to run in families. Wender (1974) cited the theory of high level of lead in the blood, found in a number of inner city children, from the lead-polluted air, and from the lead in house paint.

Ott, in Sarasota, Florida, conducted an experiment with the fluorescent lighting in schoolrooms (Arehart-Treichel, 1974). He used standard fluorescent lamps in
two classrooms, and used lighting of long ultraviolet wavelengths in two experimental classrooms, for 90 days. Positive changes in behavior occurred in the experimental rooms within that period. With more research Ott proposes to discover more of the ill effect that fluorescent lighting can have on children's behaviors. As a result of Ott's work, Michael Reese Hospital in Chicago is using long ultraviolet lights in its Dysfunctioning Child Center.

Feingold (1975) presented a unique theory for the cause of hyperactive behavior disorders. He stated that artificial flavorings and colors in our processed foods cause chemical reactions in some children, resulting in hyperactive behavior. He said their bodies have no defense against these chemicals. Instead of the use of stimulant medications, he prescribed his Kaiser-Permante (K-P) diet, which is free of all synthetic flavorings and colorings. He stated that he has found quick results in his subjects, especially the younger children. Feingold's theory needs much more research and verification before it can be considered conclusive.

TREATMENT METHODS

Remediation methods used with hyperactive children include environmental manipulation (structuring the classroom and home settings, decreasing extraneous stimuli, decreasing the alternatives, encouraging patterns of
behavior), medication to aid in carrying out these procedures, and sometimes, psychotherapy for the child, and family counseling (Walzer, 1973).

Diagnosis of hyperactivity must be detailed and carried out with care. The conference on the use of stimulant drugs in treatment of behaviorally disturbed children (Journal of Learning Disabilities, 1971) advised:

In diagnosing hyperkinetic behavioral disturbances, it is important to note that similar behavioral symptoms may be due to other illnesses, or to relatively simple causes. Essentially healthy children may have difficulty maintaining attention and motor control because of a period of stress in school or at home. It is important to recognize the child whose inattention and restlessness may be caused by hunger, poor teaching, overcrowded classrooms, or lack of understanding by teachers or parents (p. 526).

The effect of stimulants upon hyperactive children was first discovered by Bradley in 1937 (Wender, 1974). He identified the "paradoxical effect" of amphetamines when used with behaviorally disturbed children (p. 72). They have a calming effect, instead of the stimulating effect they have upon adults and average children. Recently Solomons (1971) revised the paradoxical effect theory, and called it...

a direct stimulating effect of the amphetamines which causes an increase in general alertness and excitation, along with an increase in the ability to focus attention (p. 473).

Since their effect was discovered amphetamines have been the most widely used drugs for management of hyper-
active children. These include Dexedrine (Dextroamphetamine sulfate) and Benzedrine (Amphetamine sulfate). Ritalin (Methylphenidate hydrochloride) has a similar stimulant effect, although it is not in the amphetamine group. Tranquilizers may be prescribed for the child who is severely excited or psychotic, although side effects often outweigh positive results. The two tranquilizers most often prescribed are Mellaril (Thioridazine) and Taractan (Chlorpromazine). For the child who is seizure prone, Dilantin (Diphenylhydantoin) is the anticonvulsant most often prescribed. Often Dilantin will be used in conjunction with a stimulant, but is not indicated for use with a child who has no history of convulsions (Tarnopol, 1971).

RITALIN

Ritalin is one of the most widely prescribed and effective medications for hyperactive children. It is not recommended for use with the child of psychotic emotional state, or with primary psychotic disorders; the safety of use with children under six years of age is not guaranteed. Longitudinal studies of its effect are still in progress, although some signs of growth suppression have been observed. The Physicians' Desk Reference (1974) recommended a carefully monitored prescription, especially if long-term use is expected. It is not to be used concommitantly with an anticonvul-
sant; some studies have found that it lowers the threshold of seizures.

The dosage of Ritalin should be started at a small amount, and increased gradually. It is usually started at 5 milligrams before breakfast and lunch, and increased by 5 or 10 milligram amounts until the desired effect is achieved. The daily dosage should not exceed 60 milligrams; if improvement is not observed after one month of treatment after dosage adjustment, the drug use should be discontinued. If serious side effects occur the drug use should be discontinued (Physicians' Desk Reference, 1974).

Side effects of Ritalin may be nervousness, insomnia, anorexia (loss of appetite), or possibly nausea. Usually a lowered dosage, or a period of adjustment to the medication, will alleviate the ill effects. To avoid the nighttime insomnia, no dosage is administered in the afternoon, and therefore all chemicals are out of the bloodstream by bedtime (Physicians' Desk Reference, 1974).

**AMPHETAMINES**

Dexedrine and Benzedrine are the two amphetamines prescribed most often for hyperactive behavior disorders. Both are central nervous system stimulants, often used in adult weight loss programs. When taken by certain hyperactive children they have a calming effect, and are used as aids in general management of these children. Use is not advised with children under three years of
The average dosage of amphetamine ranges from 2.5 to 40 milligrams daily, or possibly more in older children. It is started at 2.5 milligrams daily for children between three and five years of age; two doses are given, at breakfast and at lunch. The dosage may then be increased at weekly intervals by 2.5 milligrams until the optimal response is obtained. For children aged six and older, the daily dosage is started at 5 milligrams; this may be increased weekly by 5 milligram amounts until desired behavior is achieved. Use of both types of amphetamines should be discontinued if any serious side effects occur (Physicians' Desk Reference, 1974).

Amphetamine side effects may include restlessness, insomnia, dizziness, headache, anorexia, weight loss, and some elevation of blood pressure. These may occur in part, and in varying degrees. The Physicians' Desk Reference (1974) advised that the positive results of the medication must be weighed against the side effects, if any, for the specific child. If the ill effects are not significant, and they may be lessened as the child builds a tolerance to the drug, the physician may advise that the dosage be continued.

OTHER MEDICATIONS

Deaner (Deanol acetamidobenzoate) is used at times when the amphetamines are not effective or have too
serious side effects. Its action is similar to that of amphetamines, but it has a lower toxicity, and fewer and milder side effects (slight headache, muscle aches, or constipation). Given in 25 or 100 milligram tablets, the average daily dosage begins at 300 milligrams in the morning. After three weeks and some improvement is noted, the dosage is lowered to a daily 100 milligrams maintenance level. *The Physicians' Desk Reference* (1974) advised that the daily maintenance dosage not exceed 300 milligrams.

Atarax (Hydroxyzaine) is used in treatment of some individuals with psychoses, and in management of some children with hyperactive behavior disorders. Although not an amphetamine, it has a calming effect on behavior without dulling alertness. In low dosages the side effects are insignificant. The usual daily dosage for the child under six years of age is 50 milligrams in divided doses, and 50-100 milligrams for the child over six years of age (*Physicians' Desk Reference*, 1974).

**ADMINISTRATION OF MEDICATIONS**

Whenever medication use is considered, a physician must be in attendance. Wender (1973) advised that one of the following be chosen: child psychologist, who has studied both child and adult psychology; child neurologist, specialized in child and adult neurology; pediatrician, specialized in diseases of children.
A thorough physical examination will be made before any medication is prescribed, and periodic follow-up examinations are made to keep check on the effectiveness and possible ill effects of the drug.

The physician's job is to monitor the administration of the medication throughout its course. He will check for signs of over control—if the child is too quiet, too still, or nearly put to sleep, or if the child has the appearance of being stimulated (overactivity, irritability, tension, or tearfulness); if this occurs the dosage should be decreased (Laufer, 1971). Mild side effects occur in one out of eight cases in which the medication is used; usually there is no need to discontinue the dosage. In one out of sixteen cases moderate to serious side effects may occur; if they do not subside within a few days, the dosage will be discontinued, and another medication may be attempted (Gross and Wilson, 1974).

There is concern by many individuals about the side effects of stimulant use and their possible serious harm to the child. Wender (1973) advised that insomnia can be avoided if medication is given in the morning and at lunchtime only; by alleviating a dose in the afternoon, the chemicals will be out of the child's bloodstream by bedtime. Solomons (1971) warned of the "panda syndrome" including pale and sallow face, and dark circles under the eyes (p. 474). This may occur if the amphetamine is increased too quickly. Some children may experience an
allergic reaction to any or all of the drugs used; these may be manifested in a skin rash similar to hives, or a lowered white blood count, resulting in a susceptibility to fever and infections (Wender, 1973). Walzer (1973) stated that anorexia may result in some weight loss when medication is begun, but its effect will lessen as the child builds tolerance to the drug. This can be avoided by giving the dosages with meals and keeping close record of any weight changes.

Often long-term use of the medication may be necessary. In some cases it will be necessary to administer dosages on weekends and all vacations, including summers. Walzer (1973) advised that a summer vacation from medication can be a good test of a change in the child's behavior; his behavior will be evaluated after he has entered school in the fall to determine whether he should return to medication or can function effectively in school without it. This procedure will be carried out only in the milder cases, in which the children can function adequately outside of school without medication. In all cases the physician must follow the child's progress, often for a period of three to five years, or longer.

Many are concerned about the use of stimulants into the adolescent years. In many cases the drug can be discontinued during these years, as the child seems to outgrow his condition. If drug use is still necessary, close
supervision by parents and doctor is important, and possibly a switch can be made to a non-stimulant drug (Gross and Wilson, 1974). The report of the Health, Education and Welfare committee on drug use with hyperactive children (1971) stated that over thirty years of clinical experience and several research studies have shown no relationships between medical stimulant use with adolescents and later drug abuse. They explained this by the following: the child experiences no pleasurable effect from the stimulant, he thinks of it as medicine and is very willing to stop taking it, he is not left responsible for taking his own medication, and the medication is usually stopped at adolescence. The committee also advised that the use and progress of the medication should always be carefully monitored by the physician.

The child usually quickly builds a tolerance and certain dependence upon the medication administered. If he misses just one dose of the drug, his behavior may return to baseline quickly, and will be immediately noticed by parents and teachers. In some cases parents feel a drug is having no positive effect for their children, while it is actually slow in taking an effect. Solomons (1971) advised that they should be patient for the drug to build up enough to have an effect on the child's behavior before they attempt to evaluate its value. He stated that one of the most frequent causes of poor results
of drug use is premature discontinuation of the therapy. If results aren't observed the drug can be increased at weekly intervals until the desired behavior is achieved.

Tarnopol (1971) cautioned the physician prescribing a stimulant medication for his young patient as follows:

The use of drugs does not relieve the physician of the responsibility for seeking to identify and eliminate the factors causing or aggravating the psychiatric disorder... All of the currently available psycho-pharmacologic agents treat symptoms, not diseases... Symptom suppression may also delay diagnosis and hence effective treatment. To prescribe drugs for a child whose symptoms stem from intrapersonal disturbances without attempting to alter the factors causing the symptoms is poor medicine (p. 356).

EFFICACY STUDIES

Several studies of the effectiveness of stimulants in changing disruptive hyperactive behavior have been carried out. Tarnopol (1971) found 83% of 337 children studied who had improved behavior after treatment with Ritalin. Of these children 14% were found to have side effects. In a similar study with Dexedrine, 69% of 610 children had behavior improvement, while only 12% experienced side effects. Walzer (1973), in an experiment with children who had abnormal EEG patterns and neurological examinations, found 55% of 46 children improved after three weeks of Ritalin treatment. Several related experiments have found improvement in classroom behavior, group participation, and attitudes toward authority
following treatment with stimulants (Solomons, 1971).

Menolascino (1970) cited several studies in which Ritalin lowered impulsivity in the child, while it had a stimulating effect on "cortical maturation and integration", resulting in increased ability to concentrate (p. 327).

Greenwald (1971) cited a study on three children in Cincinnati public schools. This was double-blind experiment, in which the children, teachers, and attending clinicians were not aware when Ritalin or the placebo was being administered and having an effect on the subjects. Each drug, Ritalin or placebo, was administered for a two week period, during which time teachers had a checklist for evaluating changes in behavior. Results showed that behavior was significantly improved in all three children while taking Ritalin. A high correlation was found between teachers' observations and those of trained observers in the classroom.

Solomons (1971) found a placebo to bring about improvement in 67% of the children observed, while Ritalin facilitated positive changes in 88% of the children studied. Parents and teachers rated children's behavior less distractible and more attentive while taking Ritalin, which may alter the significance of the statistics. In a well-controlled study with emotionally disturbed underachieving boys, Solomons (1971) found improved behavior which included increased correct responses,
decreased reaction time, decreased hyperactive behavior, increased attention, and more cooperative behavior in the classroom.

Comly (1971) conducted a double-blind study using Dexedrine and a placebo, each for a three week period. Improvement was observed in 31 of the 40 children while being treated with Dexedrine. Conrad (1971) cited results of an amphetamine experiment, which included beneficial effects on Porteus Maze performance, Frostig perceptual quotient, auditory synthesis, and lowered number of errors on various learning tasks.

In an extensive double-blind experiment of the effect of Dexedrine and prescriptive teaching, Conrad (1971) found most effective results when Dexedrine was administered and prescriptive teaching was conducted, while little change was observed in groups receiving the placebo. The Dexedrine treatment allowed the child to better attend to and concentrate on the task at hand, and likewise benefit most from the tutoring session. Conrad listed some implications from his study, including: the hyperactive child usually has additional specific learning disabilities, and must be taught accordingly; amphetamine therapy is advised for use above and beyond appropriate prescriptive teaching strategies; medication alone may be effective for the child with hyperactivity only; more sophisticated methods of remediation of the under-
lying learning disability must be developed.

Campbell (1971) found in various studies that Ritalin treatment aided behavior in correcting task errors more quickly, improving ability to attend to auditory and visual stimuli, improving impulse control, and improving ability to inhibit incorrect responses. Tarnopol (1971) wrote that improvement in the child's behavior as a result of medication treatment will often ease the tension in the family situation. The mother's possible guilt feelings will be relieved, and she may be more tolerant of her child's behavior. She will be relieved to find that the child's problem exists within himself and is not a result of poor child-raising techniques.

DEBATE OVER STIMULANT USE

Since 1970, when shocking stories about the use of stimulants in the Omaha Public Schools were released, the controversy over stimulant use has raged throughout the United States. Comly (1971) stated that stories became sensationalized when some facts were misrepresented in the newspapers, a physician was misquoted and other facts were twisted to create an extreme situation. As a result people have been aroused to action for and against stimulant use with hyperactive children.

These objections to stimulant use are frequently voiced by parents; they find it difficult to believe in a physical rather than psychological basis for their
child's problem; medication treatment seems artificial to them; and they fear their child will develop a dependency on the drug after a long period of administration. Wender (1973) advised that the child's physician can play an important role in explaining to the parents the nature of the child's condition, and the role the stimulant treatment will play.

Walker (1974) admonished the physician in cases in which medication does not have a positive effect. He stated that the physician often does not examine the child thoroughly enough to diagnose an actual condition other than hyperactivity; likewise other treatment is in order, rather than the stimulant medication. Hyperactivity has become, for some physicians, a convenient label for children who may be hard to control for other reasons. For these reasons Walker advised physicians to look for a cause for the behavior, rather than treat only the symptoms.

A frequent complaint by parents is that school officials stress use of medications and refer too many children to physicians. At times they will also blame the schools for causing the behavior problems by boring the children in class (Keiffer, 1974). On the other hand the school officials feel at times that they are expected to solve problems in a child that may be rooted in the home situation; this will be an undue burden on the schools.
School officials in several states receive literature and information from drug manufacturers, but it must be kept in mind that a physician must prescribe all medication for a child.

Schnackenberg (Newsweek, October 8, 1973) proposed an alternative to stimulant use. After conducting studies on children in South America, who drink a great deal of coffee and show few signs of hyperactivity, he conducted an experiment with eleven children using coffee for treatment. He observed positive changes in behavior in the children, similar to those resulting from amphetamine treatment. Schnackenberg advocates consumption of two cups of coffee daily (at breakfast and at lunch) to supply the necessary 200 to 300 milligrams of caffeine. He found few of the side effects which often accompany stimulant treatment. More research in this area may show more positive results similar to those of Schnackenberg.

In March, 1971, the Department of Health, Education and Welfare sponsored a multidisciplinary panel to discuss issues related to use of stimulant drugs for children with behavior disorders. Headed by Freedman of the University of Chicago, the panel made the following statements about stimulant use with these children:

1. The drugs do not act as a cure to the behavior disorders; they will improve learning abilities in one half to two thirds of the cases in which they are used.
2. A full medical examination and diagnosis are necessary before medication treatment will be started. Environmental and family relationships, physical and psychological factors, must be considered; not all children are able to take these drugs.

3. Stimulants do not act as sedatives. Their effect is to "mobilize and increase the child's abilities to focus on meaningful stimuli and to organize his bodily movements purposefully" (Children, May, 1971, p. 111).

4. Over thirty years of clinical use of these stimulants has shown no evidence of abuse during later years.

5. A physician's consent is necessary for administering a stimulant drug; teachers and school officials cannot prescribe medication.

6. The child should not have the responsibility for taking his medication; this can be a means to avoid abuse.

7. No stigma should be attached to the child for his use of medication; it is not different from the child who wears glasses to aid his vision.

8. Manufacturers of drugs are not to promote their products through school officials; they will go through medical channels only.

9. Any misuse or abuse of any stimulant drug should be reported immediately to the proper authorities.

10. Tranquilizers and antidepressants should be used sparingly, in special cases only.

11. The panel warned that "the normal ebullience of childhood should not be confused with the very special problems of the child with hyperkinetic behavior disorders" (Keiffer, 1974, p. 115).

These excellent guidelines issued by the panel should be kept in mind by all physicians and teachers who work with children with hyperactive behavior disorders.
CONCLUSION

As a final note, the teacher's role in dealing with the child who is hyperactive is equally important as those of the physician and the parents. Small (1974) listed some teaching strategies to keep in mind: prepare short assignments for the child, provide opportunities for the child to move around the classroom if necessary, use short and explicit verbal instructions, teach the child to organize his belongings, provide a stimulus-free work and study area, use a reinforcement schedule to increase attention span, keep close communications between the home and school, establish a routine in the classroom (and encourage the parents to do so at home) with a schedule for the child.

Novack (1971) expressed the hope that, in the future, behavior modification techniques can replace stimulants in managing the behaviorally disordered child. Until that point is reached, he had a suggestion for the classroom teacher:

...teachers have two tasks to perform until science and research present more viable alternatives. One, is to supply objective observations on the effectiveness of medication in controlling behavior in the classroom. The second task is to develop classroom strategies to bring about more positive responses to learning from the children who are unable to benefit from the use of medication (p. 507).
REFERENCES


Keiffer, B. The miracle that misfired. Good Housekeeping, 1974, 1, 82, 111-115.


