EFFECTS OF SLOW STROKING ON THREE HYPERACTIVE BEHAVIORS IN A SIX-YEAR-OLD MALE

A THESIS

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To the Provost of the Graduate School:

I am submitting herewith a thesis written by Jeannette E. Burg entitled "Effects of Slow Stroking on Three Hyperactive Behaviors in a Six-Year-Old Male." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the actual degree of Master of Arts, with a major in Occupational Therapy.

Ferol Menks

Ferol Menks, Major Professor

We have read this thesis
and recommend its acceptance:

Gail L. Hardin

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Abstract

Effects of Slow Stroking on Three Hyperactive Behaviors in a Six-Year-Old Male

Unpublished thesis by Jeannette E. Burg, B.S.
for Master of Arts, School of Occupational
Therapy, Texas Woman's University, December, 1986.

This study examined the effects of the slow stroking technique used by many occupational therapists on three defined hyperactive behaviors in a 6-year-old multi-handicapped male. A single case reversal design was used with two observers counting the behaviors of seat rocking, extraneous sounds, and hand flapping during two baseline and two treatment phases. The results indicated no clinically significant changes in these behaviors following treatment. Two of the behaviors actually remained quite variable. The hand flapping behavior was the only one that did consistently decrease through out the study. Further research is recommended to evaluate the efficacy of the slow stroking technique.

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Problem

It is estimated that four percent of all school age children display hyperactive behavior (Werry, 1968), and some researchers predict that the number of hyperactive children is increasing each year (Gadow & Loney, 1981). Fine (1980) noted that by the time hyperactive children have completed elementary school, seventy percent have failed one grade, and as a group they have received lower grades than their non-hyperactive equivalents. Hyperactive behaviors are frequently associated with problems such as distractibility, short attention span, poor frustration tolerance, and school difficulties (Routh & Schroeder, 1976). The three main documented approaches to the treatment of hyperactive behaviors are modification of the environment, drug management, and behavior modification (Fine, 1980). Each has been shown to be effective in some situations, but it is difficult to predict in advance which hyperactive child will respond best to which treatment style.

Occupational therapists working in the school systems or in other pediatric settings are often involved in treating children exhibiting one or more of these symptoms. Occupational therapists have used techniques such as neutral warmth, slow stroking, rocking, and progressive relaxation (Farber, 1982) in treating hyperactivity, and claim effects such as decreased self-stimulating

behavior, improved attention span and longer in-seat behavior (Ayres, 1974; Knickerbocker, 1980). In the school setting these improvements are often linked to improved classroom performance. Despite claims, there has been little research done in the field of occupational therapy evaluating the effectiveness of such methods on hyperactive behaviors. With increasing demands for accountability, it is important for occupational therapists to have statistical data in support of specific treatment methods, such as slow stroking.

Purpose

The purpose of this study is to examine the effects of tactile stimulation in the form of slow stroking on three types of hyperactive behaviors of a multi-handicapped school age boy. A variety of forms of tactile stimulation are used by occupational therapists as relaxation techniques. Slow stroking was specifically chosen for this study because there is support in the literature for the use of this method for relaxation (Farber, 1982). A single case design was proposed, to evaluate the effects of this type of occupational therapy treatment on one client in one setting. The design is particularly useful in occupational therapy since practitioners may participate in the research and documentation process with individual clients (Hacker, 1980; Madsen, 1980).

Hypotheses

The null hypotheses to be tested are:

1) Following five minutes of slow stroking, there will be no change in the number of times a 6-year-old multi-handicapped male rocked in his seat during a five-minute period of structured free play compared to baseline.

2) Following five minutes of slow stroking there will be no change in the numbers of extraneous sounds produced by the subject compared to baseline.

3) Following five minutes of slow stroking there will be no change in the amount of hand flapping compared to baseline.

Definitions

The term "hyperactivity" is defined and used differently by various practitioners and researchers (Fine, 1980). There is some agreement as to certain behaviors that are primary, including short attention span, impulsivity, distractibility, excitability, clumsiness, and difficulty with school work (Whalen & Henker, 1980). The specific behaviors to be measured in this study include:

1) Seat rocking - The number of times that the back legs of the subject's chair come off the ground during a five-minute period while seated at a table where activities have been provided. An excessive number of these, above and beyond the forward rocking required to reach for an item, would be considered a sign of overactivity.

2) Extraneous sounds - The number of random, non-speech noises made spontaneously and without direct relation to the designated task. Even a minimum of these would be considered overactive behavior.

3) Hand flapping - The number of episodes of alternating flexion and extension of wrist and finger joints with elbows flexed at least forty-five degrees for at least a three second duration that is unrelated to the activity provided. Again, any observation of these behaviors would be considered an overactive response.

4) Slow stroking as used in this study and defined by Farber (1982) is an "inhibitory procedure involving rhythmical alternating stroking ... initiated by placing one hand at the subject's occiput and stroking lightly in a caudal direction on the skin ... on either side of the vertebral column. As the first

hand nears the coccyx, the other hand begins at the occiput ... in an even, rhythmical, continuous pattern (p. 129)."

Assumptions

This study is based on several assumptions:

1) That seat rocking, extraneous sounds, and hand flapping are behaviors associated with hyperactivity.

2) That a normal 6-year-old should be able to sit relatively quietly in his seat and attend to a task for at least five minutes.

3) That normal 6-year-olds do not make a significant number of extraneous, non-speech-like sounds or flap their hands for more than three seconds.

4) That hyperactive children have more difficulties with learning tasks due to these type of behaviors.

5) That five minutes of slow stroking is sufficient to make an effect on a subject's central nervous system.

Limitations

The results from this study will have limited generalizability because of the single case design. For further support of the technique, replication studies in other settings with different subjects must be done. Other limitations might include:

1) The potential for therapist bias in selection of a single subject.

2) That changes in the subject's behavior may also be due to the continuation of other treatments, such as speech and occupational therapy, received during the study.

3) A fatigue factor may affect results, since all observations will be done after school hours.

4) The numbers of hyperactive behaviors observed during this study may not be completely representative of the subject's hyperactive behaviors displayed throughout the day. However, observations will always be done at the same time (after 3:00 p.m.) and on the same days (Monday and Wednesday afternoons), so behavioral observations should be consistent for this time period.

Significance

This work is only significant as a step in support of a common technique used by occupational therapists working with hyperactive children. If shown through repeated testing to be a positive intervention, these studies will add information to the body of knowledge on the treatment of hyperactive children, and to the use of tactile stimulation by occupational therapists.

Summary

In brief, with the increasing numbers of hyperactive children exhibiting school difficulties, a single case study is proposed to look at the effectiveness of slow stroking provided by an occupational therapist on the hyperactive behaviors of a 6-year-old multi-handicapped male.

Chapter II - Review of the Literature

Introduction

Definitions of Hyperactivity

Hyperactivity is a controversial term, in that it has a different meaning for parents, for researchers, and for medical personnel. There are problems in defining and evaluating hyperactivity, because there are no delineated standards for what is a normal versus an abnormal activity level. Klein and Gittelman-Klein (1975) describe four difficulties in diagnosing hyperactivity:

> (a) That there are no rules specifying what or how many traits commonly associated with the syndrome warrant the diagnosis, (b) that the intensity or frequency of these traits have not been specified, (c) that situational components have not been specified, and (d) that generally the criterion for excessive activity is the tolerance of the observer for such activity ... (p.49).

Along with a lack of agreement on the definition, there is a lack of agreement on the primary symptoms of hyperactivity. Those most frequently cited include: overactivity, distractibility, impulsivity, and excitability (Childers, 1935; Marwit & Stenner, 1972; Stewart, 1973; Routh & Schroeder, 1976). A survey of teachers, psychologists, psychiatrists, social workers, and pediatricians determined that the primary behaviors related to hyperactivity were: fidgetiness, restlessness, inattentiveness, difficulty managing behavior, inability to sit still, distractibility, and low frustration tolerance (Fine, 1980). Fine (1980) further found that medical professionals are concerned with irritability, lack of discipline, clumsiness, and poor sleep habits. Secondary symptoms related to hyperactivity such as sensorimotor incoordination, low self esteem,

poor peer relations, mild apraxias, dysarthria, academic skill deficits, and delinquent acts have been noted (Werry, 1968; Woody, 1980). Werry states that "hyperactivity may exist in the absence of any other abnormality ... but that generally an increased correlation of hyperactivity with other emotional and behavioral symptoms is found, in reaction to the difficulties the hyperactive and learning disorders create for the child."

With the lack of agreement on the defining features of hyperactivity, it is not surprising to find a variety of estimates on its prevalence. Calculations currently range from 5% to 22% of all elementary school children (Lahey, 1979). Gadow & Loney (1981) report that 5 to 10 of any 100 school children are hyperactive ... and that 1 to 3 children in any typical classroom are affected. Zentall (1975) reports that 4 to 8% of all first graders and 19% of all elementary school children have been labeled hyperactive. Within a normal distribution one would expect to find at the most 2-1/2 to 5% of the children to be hyperactive, therefore the above statistics do indicate that hyperactivity is a major social and emotional problem.

Hyperactivity is generally acknowledged to be one of the most common behavior problems of childhood and several researchers feel that the number of hyperactive children is increasing rapidly (Gadow & Loney, 1981; Whalen & Henker, 1980). This increase may be a function of improved assessment and diagnostic practices, in that clinicians are now better able to recognize the condition, or some suggest that it may be due to changes in ecological factors such as, more lead in the environment due to the greater use of high octane gas, an increase in maternal smoking, florescent lighting, or food additives (Whalen & Henker, 1980; Gold & Gold, 1975). Safer & Allen, (1976) suggest that

the availability of lithium treatment for manic depression increased the frequency with which manic depression was diagnosed and that a similar escalation may be occurring with hyperactives and psychostimulants.

Barbara Tizard (1968) suggests that the hyperactive child may be no more active in the course of a day than other children but that his activity may be more socially unacceptable. She feels that the demands of the environment or situation, or the comfort of the observer may have more to do with how severely the symptoms are viewed. For instance, in a permissive family or classroom, children who might be labeled hyperactive by one observer, could be viewed as simply energetic by a different observer. Tizard (1968) investigated this with 10 hyperactive and 10 normal 8 to 10-year-olds but was unable to support her position that overactive children's behavior is noticed more because it is socially unacceptable. This research was conducted on children with IQs ranging from 20 to 40, and so these findings may not relate well to hyperactive children in the classroom who have normal IQs.

History of Studies

Hyperactivity in children became a more public issue during the late 1960's, although it has been noted in scientific writings since the early 1900's. Stewart & Olds (1973) note that in 1902, Dr. George F. Still first reported an association between behavior problems of children, which he called "a defect of moral control" and diseases like brain tumor, meningitis, epilepsy, and head injury. Twenty years later, Drs. Franklin Ebaugh and Edward Strecker in Philadelphia reported severe hyperactivity in a group of 17 children who had suffered attacks of encephalitis. Following the Philadelphia study, there were increasing numbers of reports of hyperactivity related to presumed brain

injuries, and most of the early writings tended to try and establish the fact that there was an acquired or innate organic reason for a hyperactive child's atypical behavior. It has been shown that children who suffer a brain injury are more likely to have behavior problems, however, it is also true that many hyperactive children with behavior problems do not exhibit organic pathology (Woody, 1980). Safer & Allen (1976) showed that more than 95% of hyperactive children have no evidence of an injured area in the brain, and Stewart, Pitts, Craig & Dieruf (1966) reported that only 11-16% of hyperactive children were found to have histories suggesting possible brain injury.

Beginning in the late 1950's, public health and public education services for children with learning and behavior difficulties became more prevalent in the United States. Soon after, the term minimal brain dysfunction (MBD) came into use, and investigators tried to show that there was a correlated set of symptoms indicating an MBD syndrome (Werry, 1968). In the mid-1960's and early 1970's, most of the related studies involved factor analyses of a variety of scores, ratings, and descriptors on hyperactive individuals, however, a single MBD factor was never identified. Unfortunately, even today, many investigators still assume that syndromes of hyperactivity and MBD are synonymous, in spite of research showing only a minority of hyperactive cases having obvious brain damage.

Because of the limited success at that time in pursuing the MBD concept, organic considerations were de-emphasized by some researchers and behavior modification became popular as a treatment option (Safer & Allen, 1976). At the same time, the idea that hyperactivity might have a biochemical basis was being suggested by another group, and a few children were being given

stimulant drugs. Schrag & Divoky (1975) report that about half of the diagnosed cases of hyperactivity at that time were relieved by drugs, and that since then, the numbers of diagnosed cases have doubled every 2 to 3 years.

Relation to Learning

Hyperactivity is often most clearly seen in the classroom, and school personnel are generally the most common referral source (Lahey, 1979). By the time a child reaches the first or second grade, he or she is expected to sit still and attend for long periods of time. As a result of difficulties with this, hyperactive children are commonly described as poor achievers in school and as serious behavior problems. Fine (1980) points out three main hypotheses regarding the school difficulties of hyperactives:

> (1) that the school problems are caused by neurological impairment, (2) that difficulties in acquiring school information are due to attention deficits, and, (3) that hyperactives generally make faulty decisions due to impulsivity (p. 91).

Some of the related statistics included: one third of hyperactive children have a prominent learning impairment, and another 40 to 50% have a notable academic lag (Safer & Allen, 1976). Seventy to 80% of hyperactive children have a learning disability, and approximately 30 to 45% of learning impaired children are also being diagnosed as hyperactive (Gadow & Loney, 1981). Hyperactives generally have significantly lower grades in all academic subjects, and by 12 years-of-age, 70% have failed one year at school, and 20% have failed two years (Douglas, 1972). Hyperactives also tend to drop out of school more often, and to have juvenile court records more often (Safer & Allen, 1976). From observations of the classroom behavior of hyperactive children, Virginia Douglas (1972) notes that:

> The hyperactive child tends to flit from one activity to another ... that they move around the classroom more and vocalize more ... and that they are frequently observed to be working on the wrong assignment or playing with a toy (p. 260).

There are several school intervention strategies suggested in the literature. Some authors address the stimulus characteristics of the environment, feeling that hyperactives have difficulty processing multiple stimuli (Alabiso, 1977; Fine, 1980). Alabiso (1977) writes about "selective attention" and says that this decreases as the activity level increases. He feels that the highly active child is "paying attention to everything, but selective attention to nothing." These and other authors also address the need to organize and structure the child's environment to help increase his likelihood of school success (Fine, 1977; Woody, 1980; Childers, 1935). As part of an extensive literature review, Alabiso (1977) notes that increases in attention span will result in improved visual-motor coordination and acquisition skills. Douglas (1972) also reviews a number of studies on hyperactives and in summary, states that:

> These youngsters are apparently unable to keep their own impulses under control to cope with situations in which care, concentrated attention, or organized planning are required. They tend to react with the first idea that occurs to them or to those aspects of a situation which are the most obvious or compelling (p. 260).

Douglas (1972) also describes how a hyperactive child's impulsiveness can affect learning and school performance. Douglas' (1972) review is quite extensive, however, it focuses only on drug studies with hyperactives, therefore, her conclusions may be limited by the type of hyperactive children seen. While it is true that the educational histories of these children are generally poor, Marvit & Stenner (1972) have done studies showing the overall IQ of hyperactives to be normal or above normal, therefore attributing difficulties to

behavioral problems. Safer & Allen (1972) have done five and ten year follow-up studies and found that although hyperactive children may have had early academic deficits, they are able to "attain skills sufficient for most adult involvements." So despite early school difficulties, most hyperactive children are able to function normally as adults.

Theories of Alternate Treatment Approaches

Jean Ayres

Ayres (1964) and others (Larson, 1982) proposed a theory regarding hyperactivity and tactile defensiveness, based on the two parts of the cutaneous or tactile system. The protective or spinothalamic system was thought to primarily respond to potentially threatening stimuli with movement, alertness, and a high degree of affect. The discriminative or lemniscal system was thought to be oriented more toward interpreting the nature of the stimuli and was considered to have an inhibitory effect on the actions of the protective system. Ayres (1964) states that:

> under certain circumstances, the two systems lose or never attain their natural balance, and the protective system predominates. The hyperactivity syndrome is aggravated, affect and somatic discomfort are heightened, and perceptual-motor development is retarded ... (p. 6).

Ayres (1964) defines hyperactivity as, "more than normal skeletal movement and verbosity and ... a tendency to respond to stimuli not relevant to the test situation with alertness and focusing of attention on them." She defines tactile defensiveness as, "feelings of discomfort and desire to escape the situation when certain types of tactile stimulation are experienced." Ayres states that "the individual with an overactive protective system is not only hyperactive and distractible, but his ability to perceive and learn through all sensory modalities

is physiologically inhibited." She notes that "while the organism is busily engaged in protecting itself from what it interprets as potential harm, other experiences which are necessary for perceptual-motor development are not occurring because the discriminative system is not functioning adequately."

McCracken (1975) tested the tactile perception and tactile defensiveness of 29 educable mentally retarded 7 and 8-year-old children with portions of the Southern California Sensory Integration Test (SCSIT). Six of these children had been determined to have brain damage; the other's neurological status was unknown. In summary, McCracken (1975) noted that, "it is thought that the tactile defensive child is hyperactive because of his excessive protective reactions to environmental stimulation," however, in this study, other unknown neurological factors may have affected the results. Arnold & Sheridan (1980) note:

> Much of the fidgeting, squirming, flitting about, and apparently purposeless behaviors exhibited by some hyperactive children would begin to make sense if we assume that prolonged touch becomes uncomfortable ... prolonged touch would be anxiously avoided, and the need to avoid or control exposure to prolonged touch would considerably impair the individual's freedom and ability to function (p. 531).

In their article, Arnold & Sheridan (1980) compare sensory integration techniques and implosion or "holding therapy" with hyperactive children, but they do not particularly support one technique over the other. From a historical perspective, Fisher & Dunn (1983) note that although "the hyperactive syndrome itself may not interfere with academics, the resultant behaviors and over-arousal are what interfere with learning."

Ayres (1964) suggests the controlled application of tactile stimulation to bring a better balance between the two tactile systems. By normalizing the

balance, she proposes this should "allow the discriminative system to function adequately, thereby enhancing tactile perception and reducing tactile defensive behaviors." She proposes exposure to tactile input initially within the child's tolerance level, and then increasing at a pace guided by the child's increasing tolerance. With a better balance and a more functional discriminative system, Ayres (1974) hypothesizes that one would see less of the hyperactive behaviors. There is little in the literature supporting these hypotheses, or the use of tactile techniques to reduce hyperactivity. This is in part what motivated the present study.

Arousal Level and the Use of Drugs

There are a number of researchers who view hyperactivity quite differently than Ayres does and hypothesize that "hyperactivity is a compensatory behavior to raise the arousal of a suboptimally aroused system" (Kimball, 1986; Zentall, 1975). In other words, instead of being hyperactive because of too much stimulation, children's increased activity levels are an attempt to increase an insufficient base level of stimulation. Activity is seen as a regulator which helps to maintain an optimal level of arousal for the child. Sydney Zentall (1975) used the term "Optimal Stimulation Theory", and reported that by "increasing activity during conditions of reduced stimulation, the organism approaches optimal stimulation, and by decreasing activity during increased stimulation, the organism prevents excessive stimulation."

Pope (1970) did find that certain structured tasks precipitated hyperactivity, and that the most difficult task for the hyperactive child was remaining seated for five minutes. Her study was conducted on 7 to 11-year-old boys with normal IQs and so may not be relevant to a similar female

population. From a review of research on optimal stimulation, Zentall (1975) notes that hyperactive children were not more active during recess, during free time, or during those seat work tasks which allowed for some freedom of movement, but that these children were most active while waiting their turn in group situations and during activities which involved little movement or interaction. His view is that hyperactive behaviors seem to be both a function of the absolute amount of stimulation present and the amount of time a child has been exposed to that environment. Zentall (1975) feels that the longer the child is exposed to a new situation, the more it loses its novelty and the more hyperactive behavior is seen. Tizard (1968) had similar results, finding low IQ hyperactives to be quieted by new situations but later showing increases in activity as adaptation occurred.

School treatment programs following the optimal stimulation theory would be quite different for hyperactive children than what is presently being provided. Rather than attempting to decrease environmental input, efforts might be made to increase stimulation for hyperactive children.

A third model on hyperactivity, which is somewhat related to the optimal stimulation theory, is reported by Kimball (1986) who looks at hyperactivity as a result of problems with "defective cortical inhibitory mechanisms." Bhatara (1978) also suggests that hyperactives have:

> A low level of central nervous system arousal accompanied by insufficient cortical inhibition ... and that the most noteworthy effect of a low level of cortical arousal with poor inhibition is a failure of the subject to inhibit inappropriate behavior ... so uncontrolled motor activity is seen as a result of faulty "brakes", and the lower the child's arousal system, the greater his overactive and distractible behavior (p. 315).

Considering either approach, the hyperactive child appears to be attempting to maintain an optimal level of internal and external stimulation. The unanswered question is whether the hyperactive child has difficulties with abnormally high levels of physiological arousal, which he is unable to control, or abnormally low levels of arousal, which he attempts to increase. The term hyperactivity may be somewhat like the term schizophrenia, in that it encompasses a large group of individuals with different difficulties, different needs, and probably different etiologies.

There has been quite a bit of speculation about how stimulants (primarily Ritalin and Dexedrine) produce their paradoxical effect on hyperactives. They have been used in the treatment of childhood hyperactivity for over 40 years and at present are the most common therapeutic approach with medically diagnosed hyperactive children (Gadow & Loney, 1981). Stimulants do seem to work with at least some of these children, which tends to support the optimal stimulation theory. Kimball (1986) shows how drug stimulation of a hyperactive child with underarousal can result in an increased attention span. She hypothesizes that the calming effect of the medication is a result of the child no longer needing to compensate by unconsciously trying to increase arousal levels. Conversely, considering the defective inhibition theory, drug stimulation of these children with poor inhibition mechanisms may increase the amount of input (which is already being poorly controlled), and these may be the children who respond poorly to stimulants by exhibiting even greater activity levels. There are numerous studies to show that stimulants increase attention span, decrease impulsive and explosive behavior, and generally improve the social skills and school performance of hyperactive children (McConnel et. al, 1964;

Cohen, Douglas & Morgenstern, 1971). There are also numerous contradictory studies showing that amphetamines do not work with hyperactive children (Schrag & Divoky, (1975) and that tranquilizing drugs are more effective in decreasing activity levels (Alabiso, 1977). Werry (1968) points out that drug treatment is quite acceptable to pediatricians because it is the least time consuming alternative, however, he feels that it is "one of the least effective methods in the number of children helped, scope of improvement, and duration of effectiveness."

It has been suggested that by grouping those who respond well to stimulants separately from those who do not, one might find greater homogeneity among each group (Klein & Gittelman-Klein, 1975; Kimball, 1986) and that perhaps this would be helpful in determining the cause(s) of hyperactivity. Kimball (1986) has recently suggested that if it became possible to differentiate these groups of children earlier (those responsive and unresponsive to drug therapy) "it would spare poor responders a needless drug trial."

Behavior Modification and Overcorrection Principle

While some were becoming dissatisfied with the limitations of drug treatment with hyperactive children, many psychologists and educators were developing and evaluating non-drug related therapeutic procedures for these children. Whalen & Henker (1980) among others, note that "hyperactive children are identified by their behavioral patterns ... and so feel that treatment should be evaluated in terms of its effects on those patterns." With a view of hyperactivity as a response to the demands of the environment, behaviorists began to uses reinforcers for appropriate behavior and extinction

procedures for inappropriate behaviors. Zentall (1975) and Woody (1980) note that hyperactive children appear to be particularly dependent on high rates of reinforcement and tend to revert rapidly when reinforcement is withdrawn.

Azrin, Kaplan & Foxx (1972) and Baumeister & Forehand (1973) proposed a reinforcement program "allegedly more efficient and effective for the reduction of self-stimulation and hyperactive behaviors." Much of this research was conducted with autistic and/or severely retarded institutionalized individuals, so the carryover of findings should be considered carefully. The "Overcorrection Principle" they suggest requires the subject to practice intensively a related but "correct" form of the overactive behavior (Baumeister & Forehand, 1973). Whenever a hyperactive behavior appears (e.g. hand flapping) the individual is immediately required to move that body part under verbal instruction rather than in a self-directed, self-stimulating manner. The "instructor" may manually guide the individual through the movement initially until the behavior can be brought under verbal control. The individual is then required to maintain each designated position for increasing periods of time. Reinforcement for these behaviors are smiles, praise, hugs, and candy. Azrin, Kaplan, & Foxx (1972) found this procedure "to be more effective than physical punishment, social extinction or reinforcement." They were able to decrease self-stimulating behaviors such as head weaving and stereotyped hand and finger movements by 75% in five adult institutionalized residents and 50% in four other adult institutionalized residents. These subjects had estimated IQs of 18, so results may differ with subjects of different ages or with higher IQs. When reinforcement was discontinued, overactive behaviors did increase, but to a level

significantly below the previous non-reinforced level (Azrin, Kaplan & Foxx, 1972).

In summary, a number of theories and alternatives available for decreasing hyperactive behaviors have been reported. Gadow & Loney (1981) and McConnel, Cromwell, Irving & Son (1968) show the best results using medication to reduce disruptive behaviors, while Safer & Allen (1976) report behavior therapy to be the best for increasing academic performance. In some cases it has been found useful to combine treatments.

Experimental Designs

A central problem in assessing overactive behavior has been that there is not a standard objective definition of the behavior, and it is difficult to assess what are mild, moderate, and excessive levels of hyperactivity. In addition, it is hard to compare results from experimental studies, due to the different measurements that are used. As Cromwell, Baumeister and Hawkins (Ellis, 1963) state, "a precise definition of activity depends invariably on how it is measured." One of the simplest ways to measure activity level is to observe the subject and rate certain behaviors on a specifically designed scale. The advantages of this type of measurement are simplicity and the minimal use of equipment. Some of the disadvantages are the possibility of observer error and the difficulties involved in counting high frequencies of behavior. The disadvantages can be somewhat alleviated by using more than one rater and by maintaining at least a .75 inter-rater reliability coefficient.

The importance of a rating scale is that it can be used to establish baseline information on designated behaviors, which are vital when later trying to measure changes in those behaviors. Such rating scales and questionnaires

are frequently used in drug studies and in studies on treatment efficacy with hyperactive individuals. For the clinician and/or researcher, both teacher and parent scales are important. Gadow & Loney (1981) and Sandoval (1977) in a review of a variety of rating instruments, show that teacher ratings are more sensitive and reliable than parent ratings to changes in the hyperactive child's behavior as a result of treatment. The teacher has long periods in which to observe the child in a variety of situations and can compare him with standards established from numerous observations of other children. However, these authors report that clinicians tend to be more influenced by the parent's report. Jan Loney (Woody, 1980) points out that the validity of parent scales is poor as "parents lack appropriate norms for their children's behavior." She also states that it is doubtful if parental rating is very effective in establishing a diagnosis of childhood hyperactivity. In studies where parent and teacher ratings were used simultaneously, teacher ratings did prove to be more sensitive (Gadow & Loney, 1981).

Some of the better known scales used in looking at hyperactive behaviors include: The Conners Teacher and Parent Rating Scales, the Werry-Weiss-Peters Activity Scale, the Hyperactive Behavior Observation System and Davids Hyperkinetic Rating Scale (Sandoval, 1977; Marvin, 1980). The Davids Hyperkinetic Rating Scale is generally filled out by the parent and the teacher and contains seven characteristic behaviors: hyperactivity, short attention span, variability, impulsiveness, irritability, explosiveness, and poor school work. The higher the end score, the more the findings are thought to be suggestive of hyperactive behavior. No reliability information and no norm studies are reported on this scale (Marvin, 1980). The Werry-Weiss-Peters is a 31 item

parent rating scale listing behaviors during meals, watching television, doing homework, during playtime and sleeptime, and behavior away from home and at school. Again, the higher the total score, the more likely hyperactivity is suspected (Werry, 1968). There is no reliability or norm information, and low validity reported on this scale (Marvin, 1980). The Hyperactive Behavior Observation System was originally designed for observing videotaped samples of behavior from the classroom. It consists of 35 defined categories. The categories include negative behaviors (non-compliance, talking out, and out of seat), and positive behaviors (on task, positive interactions, and volunteers), with a resulting score supposedly distinguishing hyperactive from control subjects. There is no reliability and poor validity reported on this scale (Sandoval, 1977; Marvin, 1980). The Conners scale has 39 items grouped into three subscales, addressing classroom behavior, group participation, and attitudes toward authority. These are related on a four point scale, again with the higher scores more indicative of hyperactive behavior. Conners (1969), Marvin (1980), and Abikoff, Gittelman-Klein & Klein (1977) report reliability findings between .72 and .91, and that the scale is sensitive to pre and post test changes and to behavior changes due to drug treatment. Norm studies have been done on 391 children.

Recording Data

As stated earlier, studies of hyperactive behaviors in humans have been limited by the technical difficulties of observing, recording, and analyzing the occurrence of a number of simultaneous behaviors. Typically, researchers are looking at several different behaviors at the same time, such as: whole body movements, limb movements, restlessness, number of times out of seat, attention

span, and aggressiveness. The kinetometer approach measures activity by attaching a device to an individual's limbs or trunk (Ellis, 1963). Some of the more commonly used devices include photoelectric counters, actometers, pedometers, and stabilimetric cushions. The actometer is a modified self-winding wristwatch, which can be attached to the wrist or ankle, and records numbers of movements of that limb. A pedometer is attached to the leg and measures numbers of leg movements and distance traveled. A stabilimetric cushion is embedded with sensitive microswitches and detects any squirming while seated (Sandoval, 1977). By using such devices, the subject's activity levels can often be measured under normal living situations and over longer periods of time without an observer necessarily being present. However, some of the disadvantages include the subject's awareness of wearing such a device and the possibilities of instrument unreliability or failure. Werry (1968) also points out that using these technological devices is often "too cumbersome, expensive, and awkward for routine clinical work," and many researchers prefer simply using trained observers.

Other designs that have been typically used with hyperactives include: dividing a room into quadrants by marking off areas on the floor with tape (Routh & Schroeder, 1976). The child is then observed in the room for a designated time period, and the number of times he or she crosses lines and the number of toy changes are counted. Generally each quadrant has a table and chair, with identical toys available, and the child is asked to stay in one area and play at the table (Barkley & Ullman, 1975). Inter-rater reliabilities have been high (.80) for grid crossings, change of activity, and number of times the child moves away from the work table (Sandoval, 1977). Bolstad & Johnson

(1977) had another design using two observers carrying clipboards, equipped with five second timers. Both observers wore earphones connected to the timer so both received a simultaneous signal every five seconds. Numbers of hyperactive behaviors were recorded every five seconds for ten minute periods. Coleman, Frankel, Rivto & Freeman (1976) had a similar design, with observers independently recording the duration of hyperactive behaviors by depressing a silent button. Bonadonna (1981) used a partial interval time sample design, where every 30 seconds, beeps on a tape indicated whether it was an observation or recording interval. Azrin, Kaplan & Foxx (1972) also used a time sampling procedure, and every 15 minutes an observer would view each experimental subject in rapid succession and record whether they were displaying designated hyperactive behaviors or not. Numbers of researchers have done simple observations under a variety of situations such as, during free play, during performance of a simple or difficult task, in the classroom, doctor's office, etc. These observations may be done through one way mirrors, on video, or with observers in the room with subject (Pope, 1970; Zentall, 1975; Tizard, 1968; Kaspar, Millichap, Backus, Child & Schulman, 1971).

Some of the behaviors typically looked at in these studies include:

> 1. Flapping - a) finger on thumb, b) hand flapping from the wrist, c) arm flapping from the elbow. 2. Clapping - involving the entire arm and hand. 3. Oscillating objects such as pencils, sticks, and rulers, a) from the middle b) from the end. 4. Repetitive hitting of a stationary object and 5. Gross body movements a) head rolling from side to side, b) body bouncing while sitting, and c) upper body rocking while sitting (Rivto, Ornitz, & LaFranche, 1968; p. 343).

In addition, researchers have looked at things like distractibility, task orientation and attention span (Klein & Gittelman-Klein, 1975).

A number of behaviors looked at as hyperactive behaviors are very similar to what researchers in the field of autism call "stereotypes." Mulhern & Baumeister (1969) define these stereotypes as "highly consistent and repetitious motor or posturing behaviors, with no apparent adaptive consequences for the organism." Behaviors such body rocking, head rolling, head banging, and complex hand movements are the most frequently described forms of stereotyped behavior. Other common stereotypes include: eye poking, body twirling, pill rolling, face slapping, arm banging, object spinning, unusual limb posturing, and digit sucking (Baumeister & Forehand, 1973). Research has shown that these behaviors are affected by external stimuli, can be shaped, can be increased or decreased, and can be almost totally eliminated (Baumeister & Forehand, 1973), much like the hyperactive behaviors investigated. There is a good deal of overlap in experimental design and findings between areas of hyperactivity and autism.

Experimental Findings

Experimental Results

Rivto, Ornitz, and LaFranche (1968) looked at six young autistic children and found that:

> Peaks of autistic, repetitive behaviors occurred at random intervals with no evidence of periodic or cyclic patterning ... but that although moment to moment variation was often considerable, the average amount of behavior over prolonged periods of time was relatively consistent ... with no progressive increase or decrease in the amounts of behavior (p. 347).

Baumeister & Forehand (1973) found that with institutionalized, severely autistic children:

> Body rocking and head rolling varied with the time of day ... with rates relatively low in the morning (9-10 a.m.) and in the early

> afternoon (2-3 p.m.) ... but that just before lunch and in the mid-afternoon, both markedly increased (p. 66).

They also found that these children displayed a higher rate of body rocking when other children were in the observation room, and that the average rate of rocking was higher following restraint in a chair. They did note that these stereotyped behaviors seemed to decrease when the subject was given the opportunity to engage in other motor activities, like playing with toys.

These findings from studies in autism correlate with results from hyperactivity research. Schulman & Reisman (1959) found that although activity varied greatly between hyperactive children and from situation to situation in the same child, "each child had a characteristic activity level if measured over a sufficient time period." Kasper et. al. (1971) had similar results in a study with 5 to 8-year-old hyperactive brain damaged boys and girls with normal IQs, finding that their activity levels varied greatly from task to task and between situations. While in free play situations hyperactive and normal children's activity levels were similar, in structured situations, hyperactive children were much more overactive. Some differences in responses were observed between the sexes. Lillie Pope's (1970) study on 7 to 11-year-old boys found that during undirected activity, hyperactive children's behavior did not differ significantly from normal controls, but that the "experimental group did make contact with more of the toys in the room, the average time spent with each toy was less, and that the longest duration of their contacts with toys was briefer than the time spent by controls." She also found no difference between groups in attention span and motor activity when asked to perform simple tasks, but with more difficult tasks the hyperactive group again showed a shorter

attention span and significantly greater motor activity. Conners (1970) found hyperactives to be generally more restless, to lie more, and to have problems keeping friends. Gadow & Loney (1981) also found hyperactive children to typically have very poor peer relations and poor social skills.

Clinical reports have suggested that hyperactive children outgrow their symptoms (Werry, 1968), and long term follow up studies often do show hyperactivity decreasing in later childhood and disappearing by adolescence. Minde et. al. (1971) and Whalen & Henker (1980) both show that gross motor overactivity does systematically decrease with age. In addition, Whalen & Henker (1980) noted that parental ratings of children's hyperactive behaviors also decreased with the child's age. However, Minde et. al. (1971) point out that despite decreased behavior levels, these children continue to display "other manifestations of a persistent lack of inhibition." Gadow & Loney (1981) also found continued problems with impulsivity, inability to attend, low self-esteem, and poor socialization skills. Mendelson, Johnson & Stewart (1971) in a follow up study of 83, 12 to 16-year-olds diagnosed as hyperactive and followed for 2 to 5 years found "persistent symptoms of restlessness, distractibility, impulsiveness, excitability, and aggressiveness." At the follow up, these authors found 3 out of 4 children were still giving their parents trouble about obeying rules, and 59% of the children had had some contact with the police. In a 25year follow up of 18 children originally seen for hyperactive and learning problems, Menkes, Rowe & Menkes (1967) found that:

> Four were in institutions diagnosed as psychotic, two were mentally retarded and living with their families, and eight were self-supporting ... three of the individuals complained that they still felt restless and had a hard time settling down to anything ... the other eleven reported that all signs of hyperactivity had disappeared ... three did

> not remember when this happened, and the other eight reported that it happened between eight and fourteen years of age (p. 398).

These studies indicate that during adolescence the excessive activity levels do decrease, but there is still some question whether impulsivity and poor attention span remain as serious problems. Menke, Row & Menkes (1967) "found no correlation between these outcomes and the amount of treatment the patient had received."

Occupational Therapy Literature

There have been a few studies in the occupational therapy literature that examined various types of sensory input and its effects on different behaviors. Specifically looking at the tactile system, Babetta Bauer (1977) attempted to "identify, categorize, and define the behaviors of 5-year-old boys with tactile sensitivity" in an effort to develop an accurate behavioral response checklist. Alice McCracken (1975) looked at the tactile perception abilities of 29, 7 and 8-year-old mentally retarded children, some with diagnosed brain damage and some whose neurological status was unknown. She found them to be "significantly inferior in manual form perception, finger identification, graphesthesia, and perception of simultaneous stimulation than a normal group." She also found that the subject's IQ affected their performance on these subtests, showing children with higher IQs exhibiting better discrimination. Karen Larson (1982) interviewed 20 mothers of developmentally delayed children, 10 who were described as tactile defensive and 10 who were not. In analyzing their developmental histories, she found "no great difference between groups of children with and without tactile defensiveness." Elsie McKibben (1973) tried to compare the effectiveness of tactile stimulation with eye-hand coordination

activities, looking at 5 to 10-year-old children with poor coordination and school problems. After 16 weeks of three-hour weekly treatment sessions, she found that both groups had significantly improved, but that they attained equal scores on perceptual-motor tasks, despite the differences in treatment. As she puts it, "added tactile stimulation was no more or less effective than eye-hand coordination activities in improving perception." Other than these studies, little is available looking specifically at the use of tactile input with overactive children.

Looking at the effects of other types of sensory stimulation, Paula Madsen (1980) provided tactile, vestibular, and proprioceptive input 20 minutes three times per week to three 11 to 13-year-old male children with behavior disorders and attention problems. Her results were that one child demonstrated some improvement, one negligible change, and one improved briefly, followed by deterioration of behavior. The application of these findings are limited, due to the single case design, limited number of subjects, and the fact that only male children were observed. Ayres and Tickle (1980) looked at ten autistic 3-1/2 to 13-year-old children evaluating reactions to a variety of types of sensory inputs (e.g. light touch, pain, rotation, odor). The authors had difficulty measuring changes in learning or behavior because most of the children would not cooperate with formal testing, but they did find the "hyperreactive children to be more sensitive to the sensory procedure" and suggested the importance of both tactile and vestibular input on processing. Caution is recommended in the application of these findings, as the children studied differed in age and severity of dysfunction. Penny Bonadonna (1981) looked specifically at the effects of vestibular stimulation on the stereotypic rocking behavior of three 13

to 22-year-old severely mentally retarded individuals. She found reductions varying from 9-96% in the frequency and duration of rocking behavior of each subject after a vestibular stimulation program. Again these findings are limited due to the small numbers and wide variance in frequencies. Bhatara, Clark & Arnold (1978) also found vestibular stimulation to be effective in "decreasing non-directed movements, and increasing fine motor coordination," but again, only in a single case format. Joy Huss (1977) points out the general importance of all sensory inputs and the influence these can have on motor output.

Kimball (1986) recently did some interesting research correlating the responses of hyperactive children on the Southern California Sensory Integration Test with their responsiveness or nonresponsiveness to treatment with Ritalin. She found the Southern California Postrotary Nystagmus Test (SCPNT) and equilibrium reactions indicative, with children exhibiting high scores on the SCPNT and poor equilibrium reactions to be poor responders to Ritalin. These tests are both thought to be influenced by vestibular system function, and she suggests that "it might be possible to decrease hyperactivity in good responders to medication by increasing the efficacy of their vestibular systems through sensory integrative treatment."

Summary

In conclusion, it appears that there is still little known about the etiology, definition, or treatment of hyperactivity. It seems to be a general term that can be applied to very different children who happen to share some similar behavior patterns. While sharing some common features which result in a label of hyperactivity, these children may vary in attentional deficits, learning problems, sensory motor development, and general personality characteristics.

Hyperactivity has been found to be associated with sex and age in that there are more boys than girls and most children are diagnosed in the 6 to 10-year-old range (Marwit & Stenner, 1972). Problems with hyperactivity are estimated to affect from 5 to 20% of American school children and to account for about 50% of referrals to outpatient clinics (Woody, 1980). Much of the variation in prevalence figures is due to differences in terminology and perspective. However, most researchers in the field agree on a core group of symptoms, involving an inability to sustain attention or to control impulsivity. A variety of theories and treatment techniques have been discussed. Findings suggest that hyperactive children are generally behaving in a more normal way by the time they enter their teens with or without treatment (Mendelson, Johnson & Stewart, 1971). They may be less active, distractible, and impulsive, but these symptoms can still cause problems in subtle ways.

Chapter III

Methodology

Design

This study utilized a single case reversal design (ABAB); A indicated the baseline phase and B indicated the treatment phase. Repeating the baseline and treatment phases a second time was included to add reliability to the findings. All observations and data collection were done by the author, who is a registered occupational therapist, and a speech teacher to insure greater objectivity. Inter-observer reliability was projected to meet a .80 level. Several practice sessions were planned prior to beginning actual baseline observations so that the observers could become adept at recording the defined behaviors and using the tally sheets. Inter-rater reliability coefficients were determined after seven practice sessions. The inter-rater reliability coefficient for seat rocking was .89, for extraneous sounds .79, and for hand flapping .80. These met the predetermined criteria.

Procedures

During phase A, baseline data was collected on the three defined behaviors of seat rocking, extraneous sounds, and hand flapping. Specifically, the child was observed in an occupational therapy clinic where he has been receiving therapy for the last year. Three activities were on the table each time the child entered the room. There were seven standard activities used throughout the study: 1) clay, 2) blocks, 3) paper and crayons, 4) large pegboard with pegs, 5) beads and a string, 6) nesting cups, and 7) stacking ring. The three

activities used each time were randomly selected out of a hat from among the seven for each observation period. The change in activities was designed to prevent the subject's boredom or frustration with doing the same tasks; the random selection was to eliminate a possible bias of increased or decreased attention to a favored or disfavored activity.

During the A phase, the child was instructed to "sit down at the table and play with one of the activities" for the first five minutes of the session. McConnel et. al. (1964), Tizard (1968), and Baumeister & Forehand (1970) all used four or five minute observation periods with good results in counting hyperactive behaviors. During these five minutes baseline counting of behaviors was done by both observers, who were in the same room with the subject. Ornitz et. al. (1970) and Coleman, Frankel, Rivto & Freeman (1976) all found that the presence of a passive observer in the same room with the subject did not affect the duration of hyperactive behaviors. It was projected that a somewhat stable baseline could be achieved within eight observation sessions; if not, the baseline period could be easily shortened or prolonged as necessary.

The treatment phase (B) involved five minutes of slow stroking done by the occupational therapist immediately followed by a five minute observation period by both observers. Three to five minutes of slow stroking was suggested as the optimal period of time by Shareen Farber (1982). Upon entering the clinic the student was asked to "take off his shirt and lay on the mat on his stomach." Five minutes of slow stroking was provided by the occupational therapist followed by instructions to "sit down at the table and play with one of the activities." As before, three randomly selected activities were presented. This phase was again projected to take eight sessions.

After the eighth B phase session, the next eight sessions constituted a second baseline (A) phase with no treatment intervention. The conditions and instructions of the first A period were replicated in this phase. Again eight sessions were projected. The final phase was a replication of the initial B portion with duplicated conditions and instructions. This phase was also projected to last eight sessions with the observation portion of the entire study projected to last approximately 32 sessions.

Selection of Subject

This six-year-old boy (B.J.) was chosen as the subject for this study because of his high frequency of hyperactive behaviors and resultant home and school problems. He is diagnosed cerebral palsy but displays only minimal gross and fine motor involvement. B.J. has been tested at several centers for a possible diagnosis of autism, but this has been consistently refuted, primarily due to his high levels of interaction with peers and adults. At this time, B.J. is quite aware of his surroundings and is fairly cooperative about following instructions. He is involved in a full-day, self-contained, special education school program. He also attends a private occupational therapy and speech clinic twice a week after school. All observations for this study were done at the private clinic.

The proposed experiment was discussed with and approved by B.J. and his family. The family was quite supportive of his on-going treatment and readily agreed to his inclusion in this research. B.J. also indicated his willingness to participate by marking a paper after being given a verbal description of this study. To ensure confidentiality, different initials other than the subject's real initials have been used.

Instruments

The Conners Hyperkinesis Index (Conners, 1969) was given to B.J.'s mother and teacher to fill out before the study began so that there would be information available on other's opinions about the amount of hyperactive behavior B.J. displays. This scale was chosen because it is one of the more commonly used instruments with hyperactive children (Fine, 1980). In several studies, Conners (1969) found it to be highly sensitive to behavior changes following treatment with drugs and Abikoff, Gittelman-Klein & Klein (1977) found it to be "the only scale that demonstrated validity in the identification of hyperactive children." Reliability estimates range from .72 to .91, and there are replication and norm development studies in process (Fine, 1980; Marwit, 1980). Results from the scale were used merely as added information and in no way impacted actual study results.

The tally sheet used by the raters during behavior observations was designed by the author. The primary purpose of the sheet was for ease of data collection. The three behaviors to be observed, with their definitions, appear on the left followed by five squares, each indicting a one-minute interval. Slash marks (/) were placed as a designated behavior was observed. Each observer used a stopwatch to keep track of each minute's duration.

Data Analysis

The behavioral findings derived from the observer's tally sheets were condensed into three pages, each with a separate heading - seat rocking, extraneous sounds, and hand flapping. Both observer's ratings were noted on each behavior and correlated statistically. The observer's scores were averaged for each five minute session and the resulting numbers were graphed.

Chapter IV

Findings

Results

Thirty-two, five-minute observations were completed on the 6-year-old male, B.J., over a four month period. The three defined behaviors of seat rocking, extraneous noises, and hand flapping were examined, with null hypotheses predicting that following five minutes of slow stroking there would be no change in the frequencies of these behaviors. The behavior counts were consistently done by two observers, the author, a registered occupational therapist, and a speech teacher. A final reliability correlation coefficient was run for the observations on each behavior. A high correlation was maintained, with inter-rater reliability at .93 for the seat rocking, .89 for extraneous noises, and .94 for the hand flapping behavior.

The raters' scores on the three behaviors from each five minute observation session were averaged and then graphed individually (see Figures 1, 2, and 3). The A phase points indicate a baseline count of the behaviors and the B phase points are a record of the behaviors following a five minute session of slow stroking. As seen from these figures, each behavior chosen was a high frequency and fairly variable behavior. From visual inspection of the figures, it appears that at least two of these behaviors (seat rocking and extraneous noises) continued in high frequency throughout the study regardless of whether

Figure 1

Average Number of Seat Rocking Behaviors per Observation Trial

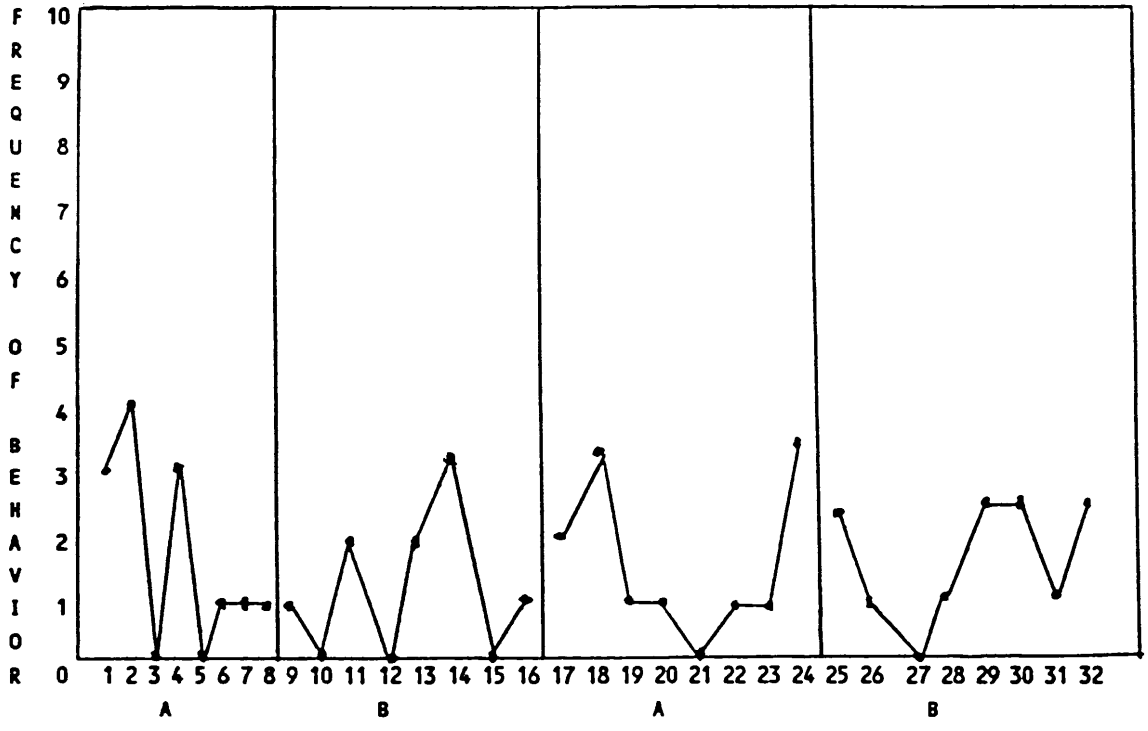


Figure 2

Average Number of Extraneous Noises Behavior Per Observation Trial

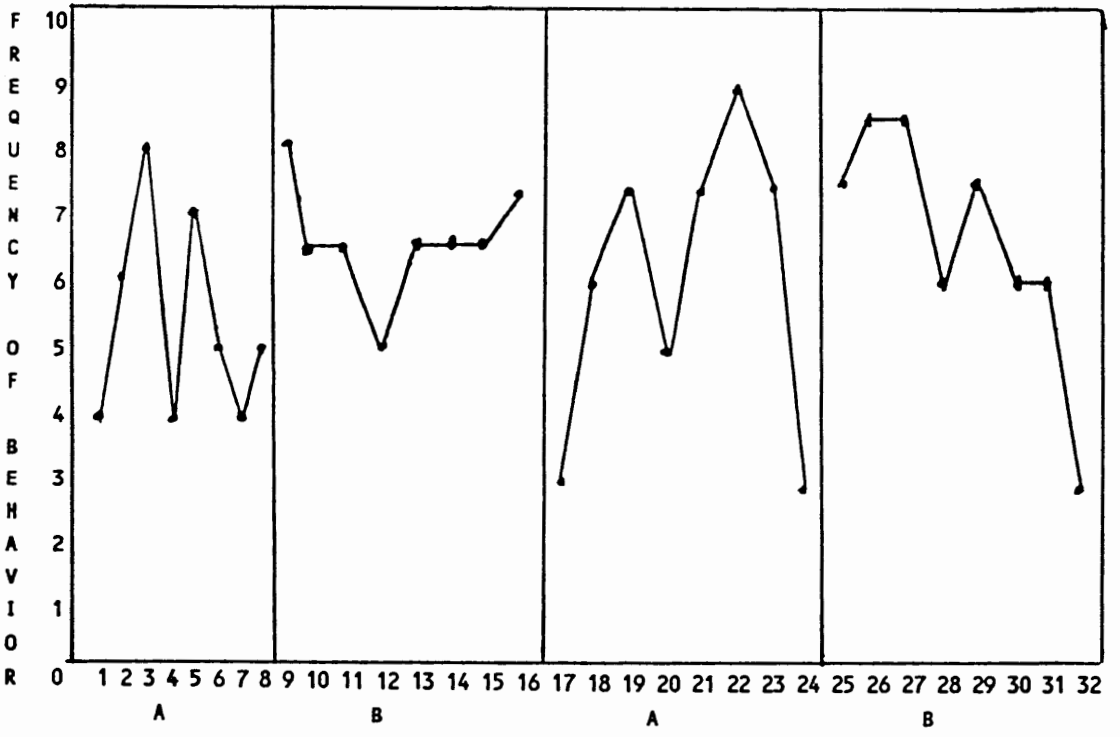
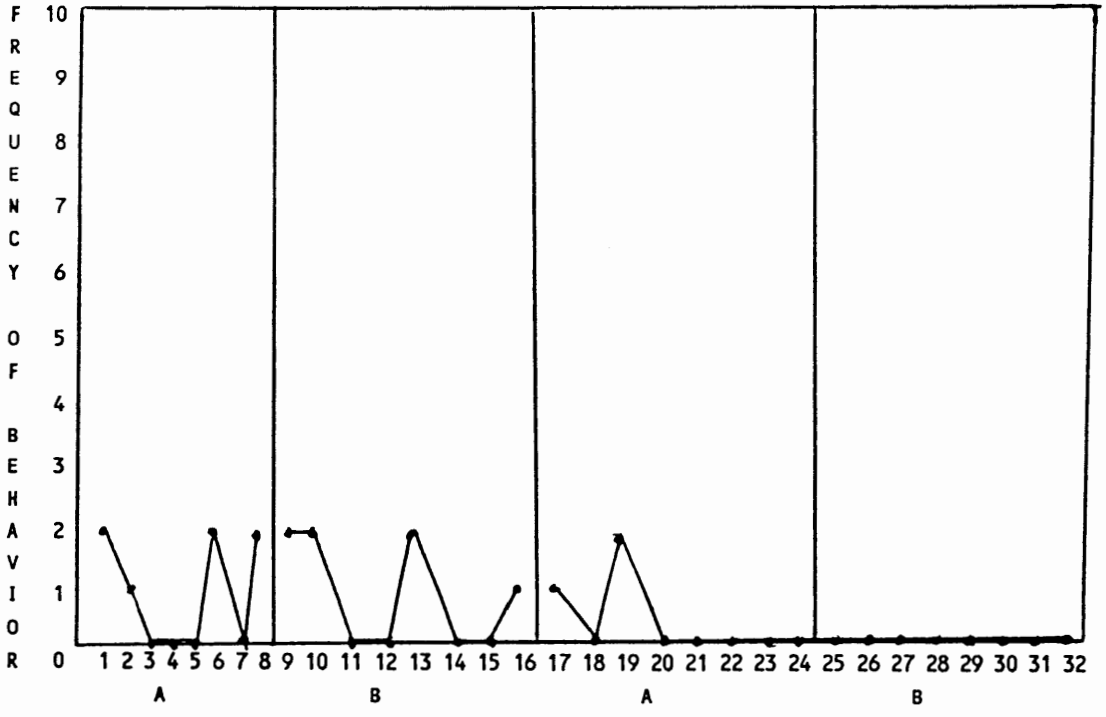


Figure 3

Average Number of Hand Flapping Behaviors per Observation Trial



in the baseline or treatment phase. The hand flapping behavior did decrease during the last twelve sessions, but again regardless of baseline or treatment phase.

Seat Rocking

The first null hypothesis stated that following five minutes of slow stroking there would be no change in the number of times a 6-year-old multi-handicapped male rocked in his seat during a five minute period of structured free play. A mean was calculated for each of the A and B phases for the seat rocking behavior. As seen in Table 1, the mean for the first baseline and treatment phase is the same, indicating no change in the average number of seat rocking behaviors, following treatment with the slow stroking technique. In the follow-up B phase condition, the average number of seat rocks actually increased slightly after treatment, over the second baseline count. A slight decrease in the overall mean is noted when comparing the first A,B sequence.

Ottenbacher (1986) described the computation of the mean shift as "the percentage of mean change from the A phase to the B phase." This is done by subtracting the mean of phase A from the mean of phase B. The mean shift for the first A, B phase of seat rocking behavior is 0 (see Table 4), again showing no change in the average numbers of seat rocking behaviors during the first 16 observation sessions. The mean shift for the second A, B portion is .75, which indicates an increase in the frequency of behaviors between the two phases.

Ottenbacher (1986) also suggests looking at the variability within and between phases by computing the standard deviation of the data points. The standard deviation calculations shown in Table 1 do indicate the seat rocking

behavior to be a somewhat variable behavior. A variability shift was computed by subtracting the standard deviation of the A phase from the standard deviation of the B phase. As shown in Table 4, the variability shift for this behavior indicates that in both phases, the behavior became slightly more variable after treatment.

Table 1

Descriptive Statistics for Seat Rocking Behaviors

Phase	Mean	Standard Deviation
A	2.0	0.81
B	2.0	1.82
A	0.75	0.95
B	1.50	1.29

In summary, it appears in this case that the null hypothesis was retained, and that after five minutes of slow stroking there was no significant or consistent change in the average numbers of seat rocking behaviors observed in a 6-year-old multi-handicapped male.

Extraneous Noises

The second null hypothesis states that following five minutes of slow stroking there will be no change in the numbers of extraneous sounds produced by the subject compared to baseline. Visual inspection of the figures reveals that the extraneous noise behavior was emitted the most frequently of the three behaviors. From the computations in Table 2, it is seen that the mean ranged from a low of 5.0 to a high of 7.5. The first A,B phase shows a slight increase in the average number of extraneous noises following slow stroking, but the

second A,B phase shows a decline in the average numbers of these behaviors. Calculations of the mean shift (see Table 4) for the first half of the experiment supports this information, indicating an increase in the average number of behaviors between the A and B phases while the mean shift of the second A,B portion indicates a decrease in the average number of observed extraneous noises.

The standard deviations of these emissions is noted in Table 2. It appears that after both treatment phases the extraneous noise behavior became less variable and that over time, the variability of this behavior gradually decreased. This is also supported by the negative variability shifts seen in Table 4 for this behavior.

Table 2

Descriptive Statistics for the Extraneous Noise Behavior

Phase	Mean	Standard Deviation
A	5.5	2.3
B	6.5	1.0
A	7.5	1.0
B	5.0	0.81

These calculations support retention of the null hypothesis that after five minutes of slow stroking there were no consistent or clinically significant changes in the number of extraneous noises emitted by a 6-year-old multi-handicapped male. In the first A,B phase the mean number of behaviors increased after treatment and in the second A,B phases, the mean number of behaviors decreased.

Hand Flapping

The third null hypothesis states that following five minutes of slow stroking there will be no change in the amount of hand flapping demonstrated by the subject compared to baseline. Hand flapping overall was the least frequently emitted behavior of the three defined behaviors. Calculations from Table 3 indicate the highest mean to be 1.25 and the lowest mean to be 0. In both A,B phases the average number of hand flapping behaviors did appear to decrease following slow stroking, and calculation of the mean shift between phases (Table 4) also supports this with the negative values indicated. However, in looking across all four phases, it is apparent that the hand flapping behavior was actually decreasing irregardless of treatment.

Minimal fluctuation of this behavior is noted through the low standard deviation scores seen in Table 3. The variability shifts of 0 and -1.0 (Table 4) indicate no variability between the first A,B phase and decreased variability in the second A,B phase. An interesting phenomenon noted during the observation of the hand flapping behaviors is the steady mean decline to 0. This behavior was completely eliminated, at least during the observation periods, by session 20.

Table 3

Descriptive Statistics for Hand Flapping Behaviors

Phase	Mean	Standard Deviation
A	1.25	0.95
B	0.75	0.95
A	0.50	1.00
B	0.00	0.00

In summary, these calculations might appear to refute the null hypothesis that there will be no change in the number of hand flapping behaviors observed following five minutes of slow stroking. Although there is a decrease in hand flapping behavior noted following each treatment session, in actuality there seems to be an overall steady decline in the behavior probably unrelated to the applied treatments. Therefore the null hypothesis is retained.

Table 4

Between Phase Statistics for Three Behaviors

	Seat Rocking		Extraneous Noises		Hand Flapping	
	AB1	AB2	AB1	AB2	AB1	AB2
Mean Shift	0.0	.75	1.0	-2.5	-0.5	-0.5
Variability	1.0	.34	-1.3	-1.9	0.0	-1.0

Summary

An overall summary of these findings indicates retention of the three null hypotheses initially proposed. From visual inspection of the figures and numerical manipulation of the findings, a clinically significant change was not observed in the three behaviors of seat rocking, extraneous noises, and hand flapping following application of the slow stroking technique.

Chapter V

Summary, Conclusions, and Recommendations

Summary

Research has confirmed that hyperactivity is a growing problem among school age children. Various theories have been proposed regarding the causes of hyperactivity, each with its own treatment approach. Occupational therapists are using techniques that they feel are effective with hyperactive children such as the slow stroking technique described in this paper, however, there is little in the occupational therapy literature documenting the effectiveness of such an approach. This study was an effort to add support to the validity of the use of slow stroking with these children.

A single case study using a 6-year-old multi-handicapped male (B.J.) was proposed, which examined three of his more socially inappropriate and interfering behaviors. These were seat rocking, extraneous sounds and hand flapping. A single case reversal design (A,B,A,B) was used with the A phases indicating a baseline observations of each behavior and the B phases indicating the number of behaviors after the use of the slow stroking technique. Null hypotheses were proposed stating that there would be no change in the numbers of each of these three behaviors following five minutes of slow stroking.

The behavioral observations were done at the occupational therapy clinic where B.J. received therapy twice a week. A total of seven standard activities appropriate for a 6-year-old boy were used, and three were randomly selected for each session. The behavior counts were done by two observers, a registered

occupational therapist and a speech teacher. The same instructions were given to the child each time by the occupational therapist. A total of 32 observation sessions were completed over a four month period.

Results from these observations supported retention of the null hypotheses, as the three behaviors remained quite variable and the mean numbers of behaviors did not necessarily decrease following slow stroking. In some cases, the average number of behaviors actually increased during treatment phase, and when the behaviors did decrease it was not always in direct relation to the application of the treatment.

Conclusions

Based on the results of this study, it appears that the slow stroking technique was not effective in decreasing the hyperactive behaviors of seat rocking, extraneous sounds, or hand flapping in the particular subject observed. A qualitative change in the subject was observed by the author during the actual slow stroking procedure, in that after two to three minutes of stroking, he would appear to noticeable relax. However, this did not seem to carry over once he sat up at the table and began playing with the toys provided.

As described earlier, B.J. is a child with a number of handicapping conditions. It is difficult to separate these from each other, and his hyperactive behaviors are only a part of the total picture. A number of factors were not controlled for in this study which may have affected the final results. Since the observations were done in the mid-afternoon, there was generally no knowledge of the earlier events in B.J.'s day. Some afternoons he would come in quietly and other afternoons he was quite wild. Some of the possible factors affecting these behaviors included: events at school that day, what he had

eaten earlier, happenings at home, the number of other children in the waiting room, and the number of interruptions during the session. In addition, during the study two major events happened for B.J. He was hospitalized briefly for inner ear surgery, and his audiologist suggested that slightly before and after his surgery, he was probably unable to hear much in his environment. In addition, during the last month of observations he began in a new school. These and other unknown factors could easily have contributed to the variability of his hyperactive behaviors.

Concurrent with the study, B.J. continued to receive occupational therapy and speech therapy. He made particularly notable gains in the speech area during this time and began to actually be able to verbalize more of this thoughts. In occupational therapy he began a typing program, which he learned quickly, and which will be another major means of communication for him in the future. It is clear that this child was making gains during the five to six months that the entire study took place, but these changes were not found to be measurable, at least by two of the three defined behaviors chosen. It is of note that the hand flapping behavior was eliminated by the end of the study. It is speculated that this may have occurred because of the subject's awareness of being observed and having his behaviors recorded. However, the decrease may have been a result of other unknown outside influences such as a stricter behavior program at school.

Recommendations

A single case design was chosen for this study due to the ease with which it could be used in an occupational therapy setting. In this case, slow stroking was not found to be an effective technique for decreasing the defined

hyperactive behaviors in the subject chosen. Further research must be done on a variety of subjects in different settings and under different circumstances to increase the internal and external validity of these findings. Behaviors other than seat rocking, extraneous sounds, and hand flapping may be more appropriate for observation and measurement, such as numbers of times out of seat, head banging, or amount of eye contact. A different method for counting behaviors, for example, using a video or one-way mirror instead of the observers being in the room with the subject, may also provide more objective results.

From the findings of this study, it would not be appropriate to totally reject the use of the slow stroking technique with all hyperactive children. However, occupational therapists should be aware that in some cases, slow stroking may not be the most effective treatment to choose. Tactile stimulation is a method used by a number of therapists, but it is a technique that has little statistical research to support it. Replication studies and further research in this area are obviously needed if occupational therapists hope to be able to demonstrate the efficacy of their work.

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Appendix A

Tally Sheet

Session # _____ Observer # _____ Activities _____

Date _____

1. Seat rocking - The number of times that the back legs of the subject's chair come off the ground during a five-minute period while seated at a table where activities have been provided.

1 min.	2	3	4	5

2. Extraneous Sounds - The number of random, non-speech like noises, made spontaneously and without direct relation to the designated task.

1 min.	2	3	4	5

3. Hand Flapping - The number of episodes of alternating flexion and extension of wrist and finger joints (of at least a three-second duration), unrelated to the activity provided.

1 min.	2	3	4	5

Make a (/) mark each time within one minute sections that the behavior is observed.

Apppendix B

Conner's Behavior Rating Scale

	Not At All	Just a Little	Quite A Bit	Very Much
1. Sits fiddling with small objects				
2. Hums and makes other odd noises				
3. Falls apart under stress of examination				
4. Coordination poor				
5. Restless or overactive				
6. Excitable				
7. Inattentive				
8. Difficulty in concentrating				
9. Oversensitive				
10. Overly serious or sad				
11. Daydreams				
12. Sullen or sulky				
13. Selfish				
14. Disturbs other children				
15. Quarrelsome				
16. Tattles				
17. Acts "smart"				
18. Destructive				
19. Steals				
20. Lies				
21. Temper outbursts				
22. Isolates himself from other children				
23. Appears to be unaccepted by group				
24. Appears to be easily led				
25. Appears to lack leadership				
27. Does not get along with opposite sex				
28. Does not get along with same sex				
29. Teases other children or interferes with their activities				
30. Submissive				
31. Defiant				
32. Impudent				
33. Shy				
34. Fearful				

	Not At All	Just a Little	Quite A Bit	Very Much
35. Excessive demands for teacher's attention				
36. Stubborn				
37. Overly anxious to please				
38. Uncooperative				
39. Attendance problem				

From C.K. Conners, (December, 1969). A teacher rating scale for use in drug studies with children. American Journal of Psychiatry, 126(6). p. 154.