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THE REDUCTION OF AGGRESSION AND HYPERACTIVITY  
IN PROFOUNDLY AND MODERATELY RETARDED  
INSTITUTIONALIZED CLIENTS BY INCREASED  
PHYSICAL EXERCISE

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PHYSICAL EXERCISE

A Thesis  
Presented to  
the Faculty of the Department of Psychology  
Appalachian State University

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts in General Psychology

by  
James F. McGimsey  
1980

### Acknowledgements

I would like to thank Dr. William Knight, Committee Chairman, and Dr. William Moss and Dr. Frank Terrant, Committee members for their valuable assistance in completing this project. I am also very appreciative of Ms. Betsy Silverman and Ms. Susan Dancey for helping conduct the procedures, and the staff at Western Carolina Center for their assistance. Finally, Ms. Meda Smith and Ms. Holly Causby deserve a dozen roses for the last minute typing of the manuscript.

## Abstract

Aggression and hyperactivity are severe behavior problems of the institutionalized retarded. Treatment techniques used to decrease such behavior problems are typically behavioral techniques such as timeout from positive reinforcement, overcorrection, or positive reinforcement for nonaggression; or medication such as the tranquilizers Mellaril or Haldol. These techniques are limited in their usefulness in the actual institutional ward setting; the behavior techniques requiring intensive staff training, and a staff-client ratio of 1 to 1, while Federal guidelines tightly control the use of medication. This study describes the effective use of a benign technique, increased exercise, to decrease the aggression and hyperactivity in 9 of 10 profoundly and moderately to severely retarded institutionalized clients. During twice daily exercise sessions clients were physically prompted to continually engage in strenuous exercise such as running, trampoline jumping, and basketball. Regular cottage staff were easily trained to use the procedures, and reported that both they and the clients enjoyed the daily sessions.

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## INTRODUCTION AND LITERATURE REVIEW

Aggression and hyperactivity are frequently viewed by professionals in the field of retardation as two of the most severe and disruptive behavior problems of institutionalized retarded clients. In a survey of a state residential facility for retarded individuals (McGimsey, Note 1), facility psychologists reported that 21% of the facility's 353 ambulatory residential population were in need of treatment for their aggression and/or hyperactivity. The development and reporting of techniques to decrease such behaviors also reflects the magnitude of the problem. In a review of ten relevant journals from 1971 to 1975, 40% of the studies addressing behavior problems targeted aggressive or hyperactive behaviors (Bates and Wehman, 1977). This clearly reflects the concern for treating such behavior problems that quite frequently result in injury to staff and other clients, and severely limits a client's participation in habilitative activities. Indeed, the learning of new habilitative skills quite often becomes secondary to the problem of controlling and preventing the client's aggression and hyperactivity, making more difficult the therapeutic goal of integration into community settings such as schools, workshops, and group homes.

The literature abounds with reported techniques for decreasing aggression and hyperactivity. Behavioral techniques for treating aggression have focused on various forms of punishment contingent on aggression, or positive reinforcement for nonaggression. The effect of electric shock on the aggression of a profoundly retarded autistic boy



was demonstrated by Birnbrauer (1968) to be initially effective in eliminating his severe aggression and property destruction within a laboratory setting. Subsequent use on the client's ward also initially decreased the client's aggression and destruction, although this trend soon reversed, and these behaviors returned to their preshock levels. As Birnbrauer and others (Bucher and Lovaas, 1967; Risley, 1968) point out the failure of such a severe punisher as electric shock to produce or maintain a decrease in a misbehavior can be attributed to the client forming discriminations surrounding the use of the punisher--discriminations between who applies the punisher, between behaviors being punished, between situations, and between different times of the day. These authors imply that such discriminations can be controlled for in a laboratory setting, but are nearly impossible to prevent in a typical disorganized ward setting. Such logistical problems severely limits the practicality of using severe punishment in all but the most dangerous cases where the urgency of treatment can force administrators to provide the staff and organization to properly conduct such a procedure.

Timeout from positive reinforcement has also been demonstrated to be effective in controlling aggression. Hamilton, Stephens, and Allen (1967) used timeout in a physical restraint chair for durations ranging from 30 minutes to 1 hour to successfully decrease a variety of behaviors including aggression in five severely retarded females. Of much more practical value are the results reported by Bostow and Bailey (1969) who used brief timeout (two minutes) and reinforcement for nonaggression to reduce

the severe aggression of a seven-year-old retarded boy. The effective use of a much shorter timeout period allows the client to spend more time in habilitative activities where the learning of new skills and appropriate behavior occurs, as opposed to the exclusion from such activities inherent with longer timeout periods. Recently it has also been demonstrated that timeout is not inherently punishing, but functions according to the nature of the timein environment (Solnick, Rincover, and Peterson, 1977). In one experiment, the use of timeout unexpectedly increased the self-stimulatory behavior of a young autistic girl, while in a second experiment the effect of timeout on the spitting and self-injury of an autistic boy was shown to be controlled by the nature of the timein environment. When timein was "enriched", timeout functioned as a punisher; when timein was neutral, being little different from the timeout environment, timeout was not effective in decreasing the client's behaviors.

To recapitulate, timeout has been demonstrated to effectively decrease behavior problems, including aggression. Short durations of timeout have also been used, when accompanied by positive reinforcement for nonaggression. Such positive reinforcement is important since it has also been demonstrated that timeout's effectiveness is controlled by the nature of the timein environment. The implication of such results are that for this procedure to be effective on a client's ward environment, staff must maintain an enriched, reinforcing atmosphere from which to timeout the misbehaving client. Typically, institutional environments are

not interesting and reinforcing, but are overcrowded, noisy, with few activities and materials to play with. Such factors make it difficult for timeout to be effective in decreasing such behaviors as aggression in the typical institutional setting.

The technique of overcorrection has also been used to decrease aggression with the retarded. Basically, overcorrection is a period of required or forced practice of appropriate behavior, contingent on an occurrence of the misbehavior. Foxx and Azrin (1972) have demonstrated this procedure's effectiveness with one brain damaged and two retarded clients' aggression and property damage. Following an act of aggression the clients were forced for 30 minutes to assist in treating their victims' wounds, filling out the necessary reports, and apologizing to other clients and staff for disturbing them. Other researchers (Matson and Stephens, 1977) have described the effective use of similar procedures. Webster and Azrin (1973) report the use of a similar technique, described as required relaxation, in which the aggressive behavior of eight retarded clients was reduced by requiring a client to spend two hours of quiet relaxation in their bed following an occurrence of aggression. Some of the essential aspects of implementing these procedures are that the practice procedure requires work and effort (except for the relaxation procedure) and is extended in duration (Foxx and Azrin, 1972). This requires that ward staff, at least initially, must use considerable force or prompting to conduct the positive practice, an aspect aversive to many ward staff, and which may affect how frequently such staff will

conduct the procedure. Webster and Azrin (1973) indicate to the contrary that staff favor such a procedure.

Finally, differential reinforcement of other behavior (in this example for no aggression or self-injury) when paired with mildly punishing procedures such as 30 seconds of timeout, response cost, or the word "No!", have been demonstrated effective in decreasing aggression or self-injury with four retarded clients (Repp and Deitz, 1974). However, ward staff typically lack the sophisticated training and ingenuity necessary to effectively conduct differential reinforcement programs, especially when they are usually required to conduct such procedures simultaneously for 10 to 15 clients.

The treatment of hyperactivity in institutionalized retarded clients has not been reported in the research literature. On the other hand, hyperactivity in noninstitutionalized retarded clients has been decreased by behavioral procedures such as prompting and differential reinforcement for sitting behavior; and timeout for inappropriate behavior. Twardosz and Sajwaj (1972) report the use of prompting and positive reinforcement for sitting behavior in decreasing hyperactivity of a retarded boy in a preschool classroom. Further, Frazier and Schneider (1975) describe the decrease of hyperactivity in the home of a three-year-old retarded boy by use of positive attention for appropriate behavior, and timeout for inappropriate behavior. Numerous studies have reported the results of behavior therapy packages on the hyperactivity of nonretarded clients (O'Leary, Pelham, Rosenbaum, and Price, 1976; O'Leary and Pelham, 1978)

which consist of instructing parents/teachers in contingency management skills (i.e. reinforcement for appropriate behavior) to decrease the client's hyperactivity.

The use of medication (primarily psychostimulants such as amphetamines, or tranquilizers such as phenothiazine) is a popular treatment for hyperactivity in both retarded and nonretarded hyperactive clients (Axelrod and Bailey, 1979; O'Leary, 1980; Brown, Note 2). Recent studies have empirically examined the effectiveness of psychostimulants on hyperactivity in nonretarded clients. Whalen, Henker, Collins, Finck, and Dotemoto (1979) examined the effect of Ritalin on a hyperactive boy in a classroom situation. Hyperactive boys on placebo showed lower rates of attention, and higher rates of gross motor activity than hyperactive clients on Ritalin, or non-hyperactive boys. Hyperactivity also varied when the environment was noisy vs. quiet, and depending on whether activities were self-paced or regulated by the teacher. In a similar environment, Pelham, Schnedler, Bologna, and Contreras (1980) demonstrated that a combination of psychostimulant medication and behavior therapy were more effective in decreasing hyperactivity than either treatment alone.

The use of medication in the treatment of retarded hyperactive clients has not been empirically evaluated as has its use with non-retarded clients. Rather than psychostimulants such as Ritalin the treatment of choice seems to be tranquilizers such as the phenothiazines (Brown, Note 2) for clients who exhibit purposeless, excited, and

uncontrollable hyperactive and aggressive behavior. Such treatment has severe side effects, often making the client unresponsive to habilitative and therapeutic activities, and exposing the client to the development of tardive dyskinesia, a syndrome consisting of abnormal stereotyped involuntary movements of the face, mouth, limbs and tongue (Jeste and Wyatt, 1980). Although aware of such adverse side effects, interdisciplinary treatment teams and physicians often have few effective alternatives to controlling such clients' behaviors.

#### Synopsis of the Problem

The behavioral techniques just reviewed have been documented in the literature as having been effective in decreasing both aggression and hyperactivity. The actual implementation of such techniques in an institutional ward environment faces problems that many of these studies do not address. Many facilities cannot provide the staff/client ratio (1:1 or 2:1) or sophisticated training and organization needed to properly conduct such procedures, while further the use of punishment and medication is usually highly restricted by Federal accreditation guidelines (Federal Register, 1974). In fact, researchers are now becoming aware of such institutional implementations problems, and are specifying procedures to overcome such deficiencies (Repp and Deitz, 1979). It is also difficult to generalize how effective these reported techniques might be with other clients since they have been documented effective with only small groups of subjects.

In actual practice within an institution, many aggressive and hyperactive clients are informally controlled by restricting their

opportunities to engage in these behaviors, e.g., highly structured activities and environments with great emphasis on keeping them calm and contained. Clients are constantly reminded to be quiet, confined much of the time to sitting or some other passive behavior, and restricted to small locked living and educational areas. Such environments have several disadvantages. First they are inhumane and illogical in appearance, particularly when one considers the size, adolescent age and robust health of many of the more aggressive and hyperactive clients. Second, and very importantly, such restrictive activities and environments may actually be sustaining aggression and hyperactivity by preventing the expansion of physical energy.

Such a lack of physical exercise in these clients' lives logically suggests that encouraging and facilitating increased physical exercise and exertion through regular daily exercise periods might be effective in decreasing their aggression and hyperactivity. To test this hypothesis two groups of institutionalized retarded clients (one group profoundly retarded, the other moderately retarded) were exposed to two daily (morning and afternoon) 30-45 minute sessions during which they were prompted by therapists to run and engage in other physical activities at a pace faster than normal walking for the duration of the session. It was hypothesized that such increased physical exercise (over their normal daily exercise) would provide staff with an effective and efficient procedure to successfully decrease these clients' hyperactivity and aggression. In a recent study involving educably handicapped clients in a public school

classroom, a 10 minute daily jog was effective in reducing classroom disruptions such as hitting others, moving about inappropriately, etc. (Allen, 1980). Such data suggests the effect exercise might have on institutionalized retarded clients' aggression and hyperactivity, although the intensity and severity of the misbehaviors differ greatly.

## EXPERIMENT I

### METHOD

#### Participants

Three male and three female residents of a residential facility for retarded individuals participated. All were residents of a special cottage for severe behavior problems and were being treated for both aggression and hyperactivity by a variety of behavioral procedures (i.e. timeout from positive reinforcement, physical restraint, positive reinforcement for nonaggression). Five were receiving medication (major tranquilizers Mellaril and Haldol) for their hyperactivity. These procedures continued during baseline and therapy. Participants averaged 22 years in age (range = 15 to 25 years) and were profoundly retarded (Vineland Social Maturity Scale age equivalents averaged 2.1 years, range = 1.5 to 2.8 years). All were in excellent physical health, had no motoric handicaps, and were permitted by their physicians to participate in the program.



### Data Collection and Reliability

For each participant, two education teachers and two cottage staff who had regular, direct contact with that participant served as raters. These raters were instructed that the rating scales they would be completing were part of an effort by the unit psychologist to better track the aggression and hyperactivity of his clients. They were not told of the participants' inclusion in the study, nor the intent of the study, but could informally view exercise sessions.

Each day these raters independently completed a two item rating scale report for their participant for the following items:

1. aggression: is aggressive toward other clients or staff by biting, slapping, hitting, kicking, pinching, or pushing in a manner that could produce physical injury,
2. hyperactivity: runs, walks, or jumps about constantly, never seeming to tire, in a manner that is inappropriate, and with no visible purpose.

Each item was rated on a five-point scale, with the anchor points being "Not A Problem", "An Occasional Problem", "A Moderate Problem", "A Severe Problem", and "A Problem Needing Immediate Attention". Many studies investigating hyperactivity with nonretarded clients have relied on the Connors' Abbreviated Symptom Questionnaire (Connors , 1976) which has proven to be quite valid and reliable (e.g., Sprague and Sleator, 1973; Werry and Sprague, 1974). An initial attempt was made to use this instrument but staff reported that scoring several of the items

was difficult--the descriptions of some behaviors were not typical of behaviors usually seen in a ward of profoundly retarded clients. Consequently, a rating questionnaire was devised with definitions more suited to the behaviors of such a population (see Appendix A).

Direct observation of each participant's behaviors was also initially attempted. However, it quickly became apparent that it was not possible to conduct the extensive direct observations needed to detect changes in a client's behavior throughout the day. Although levels of hyperactivity were consistently high, aggression was typically a high intensity, but low frequency behavior which was seldom observed with brief observations. Whalen, et al. (1979) points out similar reasons why direct observation is sometimes not a viable assessment method. Further, it has been demonstrated that with medication therapies changes are best assessed by ratings (Werry and Sprague, 1975). Presumably other therapies (e.g., increased exercise) that are attempting generalized improvement would also be better assessed by ratings.

A third source of data were incident and restriction of rights report cards which must be completed each time a staff member witnesses an act of aggression by a client which results in visible injury to another client or a staff member, or implements a restrictive therapy program such as timeout or physical restraint following an act of aggression (see Appendix B). These reports, supervised by the Human Rights Advocacy Committee are generally consistently completed by staff. However, there is

no estimate of their reliability or how well they accurately reflect the rate of a client's aggression. (A staff member, if alone, may arbitrarily and incorrectly elect not to carry out the prescribed treatment following an incident of aggression.) At best they are an informal addition to the rating scales.

Reliability of the daily ratings was calculated by two methods. First, a simple percent of agreement was calculated by comparing the ratings of two cottage staff (or two education staff) for a particular day for a participant. An agreement was defined as two observers rating a particular behavior within one-half of an anchor point of each other.

Using the formula:

$$\frac{\text{Agreements}}{\text{Agreements} + \text{disagreements}} \times 100 = \% \text{ reliability}$$

agreement averaged 83.2% weekly for all pairs of raters (range = 71.1% to 88.7%).

Secondly, Ebel's intra-class correlation (Guilford, 1954) was used to compute a correlation coefficient between raters corresponding ratings for a particular client. Using Ebel's formula (Guilford, p. 395) the resulting correlation coefficient is .516. This coefficient appears low when considered against the average 83.2% agreement calculated by the first method. Ebel reports that such a coefficient appears more reliable than usual for ratings (Ebel, Note 3). He reports that the size of the intra-class coefficient depends on two factors: (a) the closeness of agreement of the two raters, and (b) the amount of difference

between average ratings on successive occasions. Close agreements, and great difference between successive ratings yields higher correlations. Examination of the ratings obtained in this study shows that successive ratings tended to be quite similar, which would yield a lowered intra-class correlation coefficient.

#### Procedure

During baseline, participants engaged in their normal daily activities which generally included four hours in an educational classroom, and eight to ten hours within their residential cottage. A participant's usual daily exercise was limited to walking 45 minutes to and from school, and access to an outside play area 5 meters x 5 meters for 30 minutes each afternoon.

The treatment procedure consisted of two daily 45 minute exercise periods, 11:00 a.m. and 4:00 p.m., during which the participants were physically prompted by therapists to continuously run and exercise in a large fully enclosed grass area approximately one acre in size. During this exercise period two therapists allowed the participants to do whatever they wished, provided that they continuously moved at a pace faster than a normal walk. If a participant slowed to a walk, sat, or laid on the grass, he or she was immediately prompted by one of the therapists to resume exercising. Participants were carefully watched, however, for any signs of physical fatigue and were rested if they became overly tired. In actual practice, however, participants readily welcomed the opportunity to exercise,

forcing therapists to prompt each participant an average of only once each exercise period. After week four, the number of therapists was reduced to one when it became apparent he could conduct the procedure effectively.

#### Experimental Design

A multiple baseline design (Hersen and Barlow, 1978) was employed to empirically assess the effectiveness of the exercise procedure. Daily baseline ratings were obtained for all participants for one week. Exercise was then begun for one participant while baseline measures continued to be taken on the other participants. One or two additional participants were then added each week until all participants were engaged in the exercise regime. Sessions were then continued for two additional weeks as regular cottage staff were substituted as therapists, at which time continuation of the program became their responsibility. If a participant's ratings on aggression and hyperactivity systematically improved only after inclusion in the exercise program, while ratings for participants not yet actively exercising remained at their previous levels, it was demonstrated that increased exercise was responsible for reducing their aggression and hyperactivity.

#### RESULTS

Figure 1 presents weekly rating scale averages for the six participants across the seven weeks of the study. The four daily rating scale scores (by two cottage staff and two education staff) were averaged over a five-day period to obtain a single weekly rating of a participant's aggression and hyperactivity.

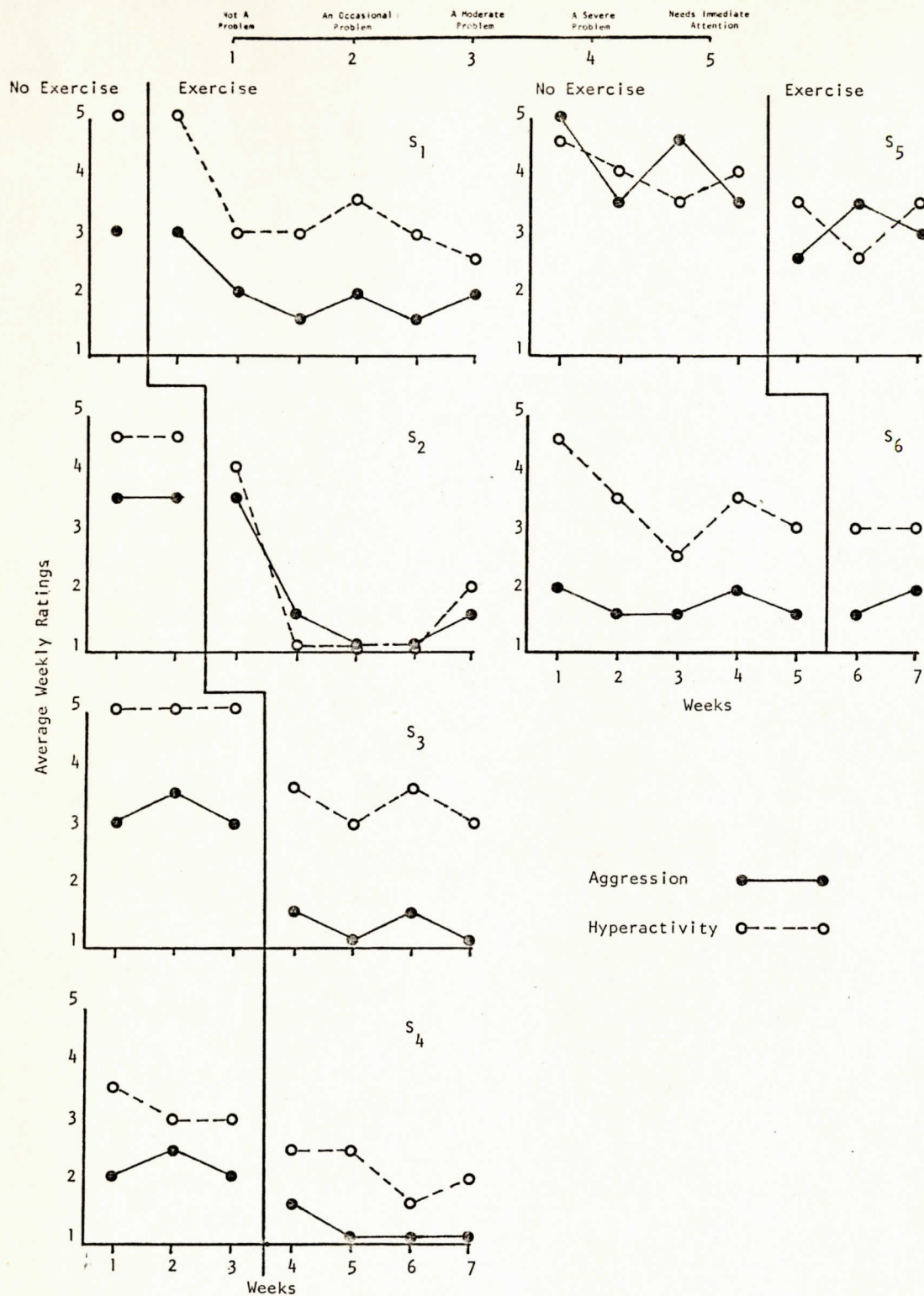


Figure 1: Average Weekly Ratings of Aggression and Hyperactivity, Experiment 1.

For participants 1-3, baseline ratings of hyperactivity indicated raters considered it "a problem needing immediate attention". Following the introduction of increased exercise, ratings subsequently decreased for all three participants; for 1 and 3 to "a moderate problem" and for participant 2 to "not a problem". Ratings for aggression, "a moderate problem" during baseline also decreased to "not a problem" or "an occasional problem".

Ratings for participant 4 also decreased following inclusion in the exercise regime. Aggression, considered "a moderate problem", decreased to what raters considered "an occasional problem", while hyperactivity decreased from "an occasional problem" to "not a problem".

Ratings for participant 5 also showed improvement, both aggression and hyperactivity being considered "a severe problem" during baseline, decreasing to "a moderate problem" during exercise. This client's ratings, however, may have been on a downward trend prior to inclusion in the exercise regime, and should be interpreted accordingly. Ratings for participant 6 showed little change as a result of exercise.

Data from incident card reports compiled by the Human Rights Advocacy Department reflects the changes seen in the rating data (see Table 1). During the first week of baseline, participant 1 had nine incident card reports indicating nine occurrences of aggression for which a behavioral treatment procedure was conducted. Following her inclusion in the exercise program, she averaged 1.7 incidents of aggression per week for the remainder of treatment. Participants 2 and 3 showed similar effects averaging 7.6 and 6.2 incidents of aggression per week respectively during baseline. During

Table 1

## Average Incidents/Restriction of Rights Reports

Participant	Experiment 1	
	During Baseline	During Treatment
1	9	1.7
2	7.6	.4
3	6.2	.2
4	4.2	.2
5	5.2	.9
6	1.2	1.1



treatment, these participants averaged .4 and .2 incidents of aggression per week, respectively. Participant 4 averaged 4.2 incidents per week during baseline, decreasing to .2 incidents per week during treatment. Participant 5 followed a similar pattern, decreasing to an average of .9 incidents of aggression per week following a baseline rate of 5.2 incidents per week. Participant 6 showed little change, averaging 1.2 incidents per week during baseline, and 1.1 incidents per week during treatment. The magnitude of the changes in these rates of aggression should not be directly compared to changes in ratings for a participant, since the intensity as well as the frequency of aggression presumably effects a rater's assessment of aggression.

#### DISCUSSION

These results indicate that for five of the six participants increased exercise may be an effective procedure for reducing aggression and hyperactivity with the profoundly retarded. However, by not removing the participants from their cottage and educational environments for baseline sessions (as was done during treatment sessions) a problem arises which may effect the interpretation of the results. (Participants were not removed as a group during baseline due to trepidation that the experimenters would not be able to control all participants at once. Indeed one participant's entry into the treatment phase was delayed to allow recovery from cuts sustained from running through a plate glass window!) Since a participant was removed from a rater's presence during treatment and not during baseline, the improvement

seen in the ratings may be attributable to the less exposure the rater has to the participant and less opportunity to observe the participant's misbehavior. A second problem involves the measurement system employed. Direct observation was not feasible to conduct due to the number of clients involved and the low rate/high intensity nature of the misbehavior. The use of rating scales was practical and efficient, although they are known to be relatively subjective and insensitive. More importantly, although raters were not told, they may have discerned the intent of the study, since they were able to informally view the participants engaged in the exercise program, and may have formed opinions regarding what effect such exercise might have on the participants' behavior. Though raters were unaware there was any connection between the ratings they were preparing each day, and those particular clients participating in an exercise program, it is not clear how their awareness of the programs existence may have effected the ratings: some of the staff expressed optimism that exercise would decrease the behaviors, some staff felt the behavior would undoubtedly worsen. In any case, such a knowledge of the clients' participation may have influenced the results.

To test the generality of the procedures just described, a second experiment was conducted to replicate the previous results with a higher functioning group of moderately retarded clients. At the same time the procedure was altered slightly, by completely removing as a group all participants from the view of raters to another area of campus during each baseline and treatment session, to control for the just described problems in interpreting the results.

## EXPERIMENT II

## METHOD

Participants

Four residents (three male and one female) of a residential facility for retarded individuals participated. These clients were referred for the study by their interdisciplinary teams for their aggressive and hyperactive behavior. The four participants were being treated for aggression by behavioral techniques (i.e., timeout, mechanical restraint), which continued throughout the study. One other client was initially selected to participate in the study but was not included due to low baseline ratings.

Participants averaged 17.6 years in age (range = 12 to 18.8 years) and were moderately retarded (Vineland Social Maturity Scale age equivalents averaging 6 years, range = 5 to 7.4 years). All again were in excellent physical health, had no motoric handicaps, and were permitted by their physicians to participate in the program.

Data Collection and Reliability

As in the previous study, two education teachers and two cottage staff served as raters for each participant. These raters were unaware of the previous study. Again these raters were not told of, but may have discerned, the intent of the study. However, as described in detail later, all participants were removed as a group from the view of any raters to another area of the campus during each baseline and exercise

period, effectively making the raters unaware of when a client may have begun the exercise program, or whether he was participating at all.

Raters were given the same instructions as described earlier, and used the same rating instrument. Direct observation was not attempted in this study. Incident report cards were also reviewed as described previously.

Reliability was again assessed by the two methods described earlier. Rater agreement averaged 79.6% agreement weekly (range = 67.1% to 87.2%). The Ebel intra-class correlation coefficient was .496.

#### Procedure

In contrast to the procedures described in the previous study, all participants in this study were moved to a different area of the facility's campus during all of the 30 minute baseline and exercise sessions at 11:00 a.m. and 4:00 p.m. Raters therefore received equal daily exposure to participants and were unaware of when a participant began exercising, thus controlling for the possible effects of rater bias.

Throughout the study, participants again continued to engage in their normal daily activities which included 6 hours in an educational setting, and 8 to 10 hours in their cottage environment. Due to their higher level of adaptive behaviors, these clients' cottage environments however allowed them much greater freedom and choice of activities than the environment of the more severely retarded clients described in the previous study.

During baseline sessions, participants were moved as a group to

another area of the campus, and participated in quiet activities such as sitting, talking and easy walking.

During treatment sessions, participants were prompted and reinforced by the therapists to strenuously run, play basketball, or jump on a trampoline. The degree of strenuous participation by these clients during all of the activities varied, forcing the therapists to frequently prompt the participants to strenuously exercise. A prompt was defined as the brief physical assistance needed to require a participant to resume the activity if he/she stopped. Prompts averaged 10.3 per participant per session. Again, participants were carefully watched however for any signs of physical fatigue and were rested if they became overly tired.

As before, a multiple baseline design was employed to empirically assess the effectiveness of the exercise procedure.

## RESULTS

Figure 2 presents the average weekly ratings of aggression and hyperactivity for the four participants across the 11 weeks of the study. These average scores were computed as described in Experiment I.

For participant 1, baseline ratings of hyperactivity indicated that it was a problem "needing immediate attention". Following inclusion in the exercise regime, ratings decreased until raters considered it less than "a moderate problem". During both baseline and exercise, raters considered aggression "not a problem" to "an occasional problem". Incident

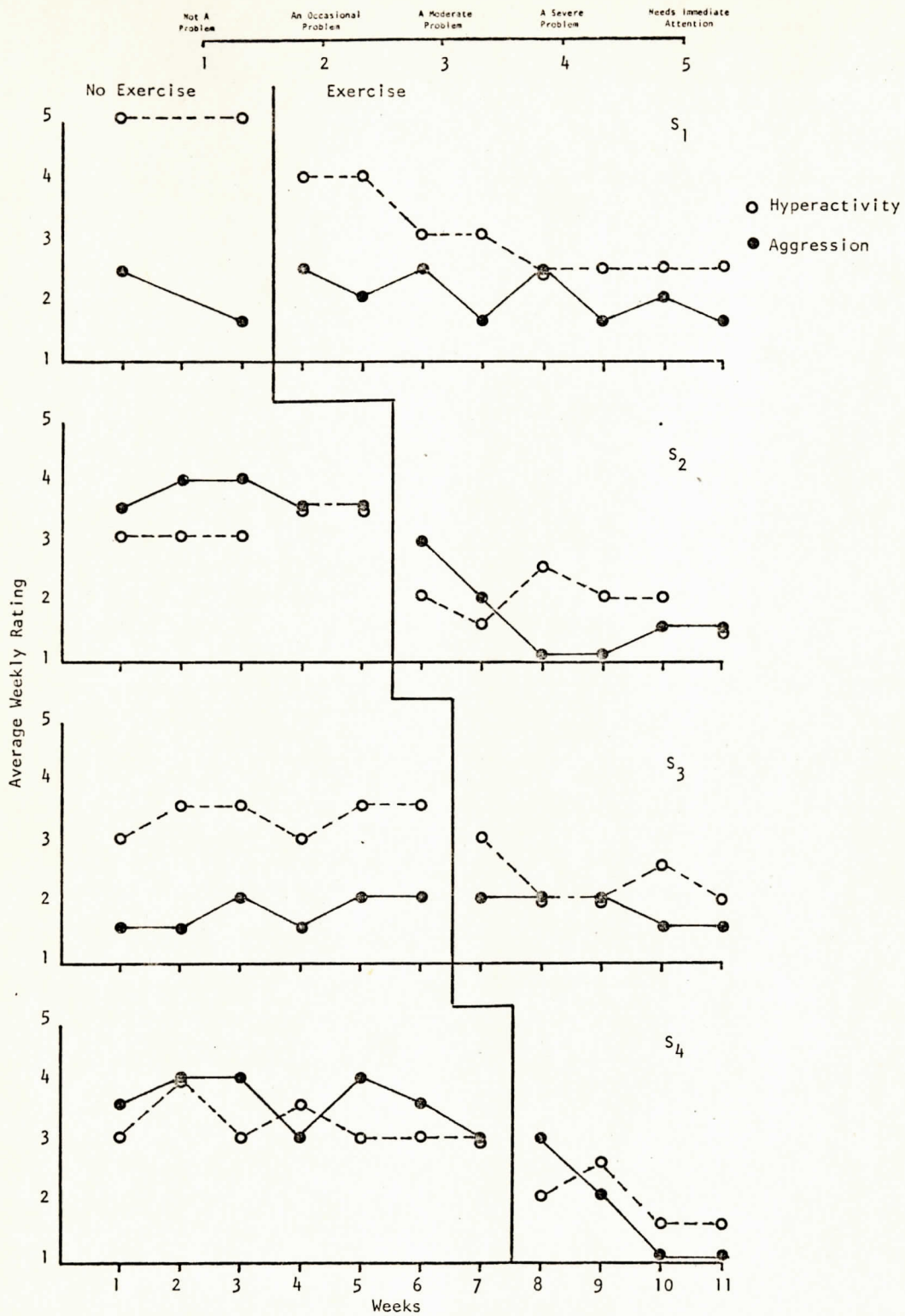


Figure 2. Average Weekly Ratings of Aggression and Hyperactivity, Experiment 2.

Table 2

## Average Accident/Incident Reports

## Experiment 2

Participant	During Baseline	During Treatment
1	3.2	.1
2	8.6	0
3	0	0
4	5.6	1.2 (0 last 2 weeks)

card reports of aggression averaged 3.2 per week during baseline, decreasing to .1 per week during treatment (Table 2).

For participant 2, raters considered both aggression and hyperactivity a moderate to severe problem during baseline. After inclusion in the exercise program, ratings again subsequently dropped, particularly for aggression which raters now considered "not a problem". During baseline, incidents of reported aggression averaged 8.6 per week, decreasing to 0 per week during treatment.

Participant 3's baseline ratings for hyperactivity indicated a moderate to severe problem, which consequently decreased to what raters considered "an occasional problem" following the introduction of exercise. Aggression was not considered a problem during both baseline and the exercise regime. Reported incidents of aggression were nonexistent.

Raters considered participant 4's aggression and hyperactivity to be a moderate to severe problem during baseline, decreasing to "an occasional problem", and "not a problem" during treatment. Reported incidents of aggression averaged 5.6 per week during baseline, decreasing to 1.2 per week during treatment (0 per week the last 2 weeks of the study).

#### GENERAL DISCUSSION

These results indicate that for nine of the ten participants, increased exercise was an effective yet benign and practical procedure for reducing aggression and/or hyperactivity in both profoundly and moderately to severely retarded clients.

Staff training of the procedures required only a few minutes of brief



instruction, while the treatment itself was conducted during previously "free" time, not interrupting important educational and habilitative training. Staff reported that conducting the procedure was actually pleasant for both staff member and client alike, and both looked forward to the daily sessions. Staff compliance is particularly important considering the usual aversiveness of conducting punishing behavioral procedures with retarded clients.

Although the rated aggression and hyperactivity of participant 6 did not decline in Experiment 1, it is nevertheless promising to note that even with this profoundly retarded client, the increased exercise did not cause increases in these behaviors as had been feared. Further, concern that he would be unmanageable was unjustified. The present data emphasizes the feasibility of not excluding clients from particular activities on the basis of a priori assumptions, in this case that unmanageable behavior would result from participation in strenuous exercise.

Although the results of Experiment 1 are confounded by the problems of rater bias regarding the effects of exercise, and differing amounts of rater/participant contact between baseline and treatment such problems are effectively controlled for in Experiment 2, which demonstrates a quite similar effect of exercise on aggression and hyperactivity. Such a similar effect makes the results of Experiment 1 more plausible, and lessens the potential contribution of these procedural problems to the decreased ratings.

Further research is needed to explore the differing parameters that may increase the generality of the results, as well as the contributions of specific components to the effectiveness of the exercise regime. Components directly affecting the expenditure of energy such as intensity,

frequency, regularity, duration, and type of exercise, as well as the size of the exercise area or exercise group need to be analyzed for their contributions to the procedure's effectiveness. Boe (1977) has demonstrated that factors such as client density can affect levels of aggression in an institution dayroom. With the exercise procedures described in this study, the time provided in a much less crowded environment, with encouragement to utilize the space and freedom available, may enable the client to cope more successfully with more crowded and structured situations during the remainder of the day.

In summary, this study demonstrates that increased exercise is certainly feasible to conduct with aggressive and hyperactive institutionalized clients, and with the majority of the clients involved, was effective in decreasing their aggression and hyperactivity. When compared with the behavioral techniques usually employed to treat such inappropriate behavior, increased exercise appears to be a benign and practical technique for staff to employ.

## Reference Notes

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APPENDIX A: SAMPLE RATING SCALE REPORT

Psychology Behavior Report

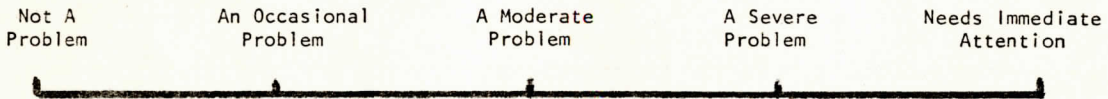
Resident \_\_\_\_\_

Rater \_\_\_\_\_

Date \_\_\_\_\_

At the end of each day please rate how you would describe this resident's behavior for the day:

1. Aggression: is aggressive toward other clients or staff by biting, slapping, hitting, kicking, pinching or pushing in a manner that could produce physical injury.



2. Hyperactivity: runs, walks, or jumps about constantly, never seeming to tire, in a manner that is inappropriate, and with no visible purpose.

