Physical Activity As A Reinforcer In Physical Education

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A systematic management program is often needed to control student behavior or elicit their optimum level of performance. One management system that is beginning to receive attention in physical education is the application of physical activity reinforcement (McKenzie, 1979; Siedentop, 1983). This system of reinforcement is defined as a systematic procedure in which a structured time to choose among various physical education activities is contingent on the individual's meeting a predetermined criterion of behavior. The following discussion of the research conducted on program strategies and benefits utilizing physical activity reinforcement will enable practitioners to incorporate such a management system into their physical education program.

Loovis (1980) and Roice (1982) have questioned whether current teaching practices to manage behavior and improve motor performance used by physical educators are effectively meeting the unique educational needs of all handicapped students. If current teaching strategies are not meeting the needs of some students, then what alternative approaches are available? Many physical educators are exploring various behavior management strategies (Dunn & French, 1982; Loovis, 1980; McKenzie, 1979; Siedentop, 1983).

Guidelines in adapted physical education were established in 1981 by the American Alliance for Health, Physical Education, Recreation and Dance. These guidelines state that adapted physical educators should be competent in the application of behavior management strategies. Specifically, these specialists should be able to apply appropriate techniques to students in order to enhance acceptable behavior and promote motor performance (Hurley, 1981).

In order to motivate certain students to participate successfully in physical activity, the use of reinforcement strategies in physical education is recommended. Positive reinforcement is defined as any event that follows and strengthens the frequency of that behavior (Kazdin, 1980). One particular reinforcement system receiving attention by physical educators is the application of physical activity as a reinforcer (McKenzie, 1979; Siedentop, 1983). This is defined as a systematic procedure in which a structured time to choose among various preferred physical education activities is contingent on the individual's meeting a predetermined criterion of behavior.

The uses of behavior management strategies in physical education have been discussed in the past (Donahue, Gillis, & King, 1980; Dunn & French, 1982; Loovis, 1980; McKenzie, 1979; Presbie & Brown, 1977; Siedentop, 1983). The purpose of this paper is to review the research and to discuss the program strategies and benefits related specifically

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to physical activity reinforcement. This information will enable practitioners to incorporate this type of management system more effectively into their physical education programs.

Review of the Research

Surprisingly, a minimal amount of research specific to physical education has been conducted using physical activity as a reward system (see Table 1). These studies, although few, have been conducted over a variety of physical education settings and populations. Examination of these studies will give the practitioner a better understanding of different strategies that have been incorporated into various physical education programs.

Studies have been conducted utilizing various populations and exceptionalities. Allen and Iwata (1980), Huber (1973), and Lavay (1983) investigated mentally impaired individuals. The effect of physical activity as a reward system with 23 behaviorally disturbed school-age children was studied by Vogler (1981), and 6 emotionally disturbed adolescents at a residential state hospital were investigated by Jansma (1972). In addition, both Lacoste (1983) and Young (1973) reported studies utilizing normal elementary school age children.

The strategies used to implement physical activity as a reward system have varied. The contingency management point systems, the Premack principle, “behavior games,” and group contingencies have been used by various investigators. Studies by Allen and Iwata (1980) and Jansma (1972) utilized the Premack principle. Jansma (1972) had each adolescent select a high preference activity as a reward for first participating in a low preference activity. For example, one individual who demonstrated withdrawn behavior was rewarded with 5 minutes of individual weight lifting immediately following his participation for 5 minutes (continuous or cumulated) in a volleyball or basketball game with other patients. Allen and Iwata (1980) made game participation among subjects contingent upon the completion of different exercises.

In a study by Young (1973) two “behavior games” were initiated with all students investigated. Points toward an additional physical education class were awarded to those individuals who behaved appropriately during an interval schedule or who passed a self-testing skills test.

The use of a group contingency reinforcement system was reported by both Lacoste (1983) and Vogler (1981). Reinforcement in the form of a volleyball game with verbal praise from the physical education teacher was contingent on the entire group’s meeting a predetermined criterion level on selected volleyball playing skills (Lacoste, 1983). In the Vogler study, groups were divided into teams and earned points which could be exchanged for highly desirable physical activities such as jumping on a minitrampoline.

Investigations conducted by Huber (1973) and Lavay (1983) utilized a contingency management point system. In both studies, points earned during the week could be exchanged for proportional minutes of time to engage in an additional physical education class (Huber, 1973) or in any of four physical education activities displayed on a reinforcement menu (Lavay, 1983).

In the majority of these studies, the students were allowed to select the reinforcement item(s) they desired for a reward. Physical activity was used as a reinforcer to determine its effects on physical task performance as well as on the behavior of subjects. The results indicate that inappropriate behavior can be reduced significantly when physical activity is used as a reward system (Huber, 1973; Jansma, 1972; Vogler, 1981; Young, 1973).
<table>
<thead>
<tr>
<th>Study</th>
<th>Subjects</th>
<th>Reinforcer</th>
<th>Independent variable</th>
<th>Dependent variable</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen &amp; Iwata</td>
<td>10 institn. MR adults</td>
<td>Participation in games</td>
<td>Premack principle</td>
<td>5 different exercises</td>
<td>Games a significant reinforcer in exer. performance</td>
</tr>
<tr>
<td>Huber (1973)</td>
<td>11 EMR students</td>
<td>Additional physical education</td>
<td>Token economy point system</td>
<td>Appropriate behavior and motor tasks completed</td>
<td>Token economy significant in improving behavior</td>
</tr>
<tr>
<td></td>
<td>7-11 yrs.</td>
<td>class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jansma (1972)</td>
<td>6 ED males</td>
<td>Highly desirable physical activity</td>
<td>Premack principle</td>
<td>Inappropriate behavior</td>
<td>The target behavior of all subjects was altered</td>
</tr>
<tr>
<td></td>
<td>15-19 yrs.</td>
<td></td>
<td></td>
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<tr>
<td>Lacoste (1983)</td>
<td>130 nonhandicapped 4th graders</td>
<td>Volleyball game</td>
<td>Group contingency reinforcement or No reinforcement</td>
<td>4 volleyball skills</td>
<td>Significant increase in 2 of the 4 volleyball skills</td>
</tr>
<tr>
<td>Young (1973)</td>
<td>31 nonhandicapped 2nd graders</td>
<td>Additional physical educ. class</td>
<td>Behavior game group contingency</td>
<td>On-task behavior</td>
<td>Behavior game significantly increased on-task behavior</td>
</tr>
<tr>
<td></td>
<td>6-12 yrs.</td>
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<tr>
<td>Vogler (1981)</td>
<td>28 TMR males</td>
<td>Tangible and physical activity reinforcement</td>
<td>Tangible reinforcement, Physical activity reimbursement, or No reinforcement</td>
<td>3 physical fitness tasks</td>
<td>No significant difference among groups</td>
</tr>
<tr>
<td></td>
<td>12-21 yrs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>23 BD students</td>
<td>Highly desirable physical educ. activity</td>
<td>Behavior game group contingency</td>
<td>On-task behavior</td>
<td>Behavior game significantly increased on-task behavior</td>
</tr>
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<td></td>
<td>6-12 yrs.</td>
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<tr>
<td></td>
<td>31 nonhandicapped</td>
<td>Additional physical educ. class</td>
<td>Behavior game</td>
<td>Appropriate behavior and skill acquisition</td>
<td>Significant increase in behavior</td>
</tr>
<tr>
<td></td>
<td>2nd graders</td>
<td></td>
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</tbody>
</table>

Table 1
Studies Utilizing Physical Activity as a Reinforcer

- Huber (1973): 11 EMR students, 7-11 yrs.
- Lacoste (1983): 130 nonhandicapped 4th graders
- Young (1973): 31 nonhandicapped 2nd graders
However, the ability to increase motor performance scores is inconclusive. Huber (1973), Lavay (1983), and Young (1973) all reported no significant increase in motor performance among individuals investigated. Lacoste (1983) found a significant increase in the mean scores of the group contingency reinforcement groups over the other three groups in only two of the four volleyball playing skills investigated: volleying and setting. The Allen and Iwata (1980) study was the only investigation to find conclusively an increase in motor performance among individuals; it reported an increase in the number of exercises completed along with a decrease in the number of minutes needed to complete the exercise program. It is apparent that further investigations are needed to determine which management systems and physical activity reinforcers are most applicable to the physical education setting and whether physical activity reinforcement can clearly increase students’ motor performance levels.

**Program Application**

To assure successful application of the physical activity reinforcement system, a carefully planned systematic program must be designed by the physical educator. Management systems can be incorporated into the physical education setting in a positive manner; students should never be forced to run laps or to exercise as a punishment in order to decrease inappropriate behavior. These techniques are merely suggestions; the physical education teacher must consider student needs first, as well as program goals and objectives.

The first step in developing any type of management system is to define the desired behavior or performance change with the teacher selecting behaviors that are measurable and that have a precise beginning and end to the movement (White & Haring, 1980). The desired behavior change should be discussed among the teacher, the parent and, when possible, the student.

A starting point for the teacher is to observe and chart the particular behavior over a period of time. For example, an improvement in 1-minute sit-up performance may be the desired behavior change. The teacher can begin by charting each student’s sit-up performance over a period of time which will establish individual baseline scores (the average of the total number of scores obtained during the period of measurement). Individual baseline scores will prove helpful later during the design of the reinforcement system.

The second step to program success in any management program is the systematic application of the reinforcer only when the student meets a predetermined criterion of behavior and/or performance (Campbell, 1974). A contingency management point system, “behavior games,” and group contingencies are all management systems applicable to physical education. An example of physical activity reinforcement being applied to these management systems is the following: A student’s baseline score in 1-minute sit-up performance has been established at 15. The teacher then explains to the student that 1 point can be earned for each sit-up performed that equals or exceeds the baseline score. The student can exchange each point earned for 1 minute of a predetermined form of physical activity he or she enjoys. A student earning 5 points is able to exchange them for 5 minutes of preferred physical activity. To apply this management system to an entire class, the reward can be made contingent on the entire group’s meeting a predetermined criterion of behavior and/or performance level (Siedentop, 1983; Vogler, 1981).

The Premack principle is another management system to reinforce student behavior or performance. This principle is defined simply as a more preferred behavior or
activity the student enjoys being made contingent on the student's performing a less preferred behavior (Jansma, 1978). For example, at the beginning of class the teacher might say, "All students who participate in and successfully complete the warm-up exercise program [the less preferred behavior] at the beginning of class may play 5 minutes on the scooter boards [the more preferred behavior] at the end of class." To assure successful application of the Premack principle, the teacher may need to rearrange the scheduling of class activities; otherwise, students who play on the scooter boards at the beginning of class may be uncooperative when it is time to begin exercising.

If the physical activity reinforcement system is to be successful, the teacher must also consider reinforcer preference. Bishop and French (1982) noted that the very nature of the particular reinforcer can have a strong influence on student performance. The teacher cannot assume that all students will prefer the same activities; in fact, some students might not enjoy any type of physical activity. To determine reinforcer preference, the teacher can either observe the student during activity, talk with the student's classroom teacher or parents (who usually know the student best), or, if possible, simply ask the student.

The final step in program design of physical activity reinforcement is to implement an exchange system in which points earned by the students can be exchanged for proportional minutes of time to engage in physical activity. A list of student-preferred activities, along with the rules or guidelines for engaging in these activities, can be displayed in the gymnasium. A reinforcement event menu (Gardner, 1978) can stimulate student interest, serving as a reinforcer in itself by providing continuous feedback to the students of the rewards being offered (Moon & Renzaglia, 1982). Pictures of the reinforcers may be used for students who are unable to read. The activities offered should be compatible with the goals and objectives of the physical education program (see Table 2).

### Table 2

**Physical Activity Reinforcement Menu**

<table>
<thead>
<tr>
<th>Items</th>
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<tbody>
<tr>
<td>1. Performing an exercise routine as seen on a videotape cassette;</td>
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<tr>
<td>2. Moving through an obstacle course;</td>
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</tr>
<tr>
<td>3. Moving on a scooterboard;</td>
<td></td>
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<tr>
<td>4. Running and jumping on a mini &quot;jogging&quot; trampoline;</td>
<td></td>
</tr>
<tr>
<td>5. Riding a stationary bicycle.</td>
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</tr>
</tbody>
</table>

**Rules**

1. Students may earn 1 minute of free time to engage in the above physical activities for each point earned during performance in the physical task program each week.
2. Students may shift back and forth among the physical activities during their earned amount of free time.
3. Students may only accumulate 30 minutes of free time to engage in physical activity during each reinforcement period.
Program Benefits

Using physical activity as a reward system can lead to a number of student and program benefits. The teacher must realize that certain students do not respond to the application of social reinforcement in the form of a smile, a handshake, or verbal praise (Kazdin, 1980), and tangible reinforcement such as food, toys, or money can become quite expensive (Wolf, Giles, & Hall, 1968). The physical education setting usually contains readily available reinforcers in the form of equipment and games; such reinforcers add no extra cost to the physical education budget (Allen & Iwata, 1980).

The availability of equipment and games to choose from increases the probability that the teacher will find an activity each student enjoys. Moreover, there will be less opportunity for an activity to lose its reinforcing effect if students can shift among a variety of activities (Siedentop, 1983). For example, a student who earns 10 minutes of physical activity reinforcement may spend 5 minutes participating in one activity and 5 minutes in another. Allowing students the freedom to choose and shift among a variety of physical activities may prove to be motivational in itself.

Incorporating an exchange system into the program by making each point earned worth 1 minute to engage in selected activities thus frees the teacher from placing a point value on each reward item. For certain students, a reward with a low point value may prove to be most reinforcing and the students will remain perfectly content to earn only a few points as long as they are rewarded with their favorite item. However, the exchange system allows the student to decide how to spend earned points. The student quickly realizes that the more points earned, the more time to engage in a preferred activity; for certain students this proves quite motivational.

Perhaps the most important benefit of using physical activity as a reinforcer is that it not only serves as a reward system but has the potential to improve the student’s physical performance level as well. The teacher can meet the goals and objectives of the physical education program while simultaneously reinforcing the student. Obviously, climbing a tire mountain, shooting baskets, or riding a stationary bicycle is more beneficial to the student’s motor performance and well-being than being rewarded with a toy or candy.

Conclusion

Physical activity as a reward system has been used in a variety of physical education settings with various populations and exceptionalities. To meet student needs when developing a management program, the physical educator must be prepared with a systematic plan. The teacher must consider the desired behavior, appropriate reinforcement application, and individual and group reinforcement preference. A contingency management point system, the Premack principle, behavior games, and group contingencies are all strategies that have been systematically incorporated in the physical education setting. There are numerous benefits of incorporating such a system: program budget savings, less chance of rewards losing their reinforcing effect, students being allowed to decide their own rewards and, most important, enhancement of program goals and objectives. Physical educators seeking to reduce inappropriate behavior and stimulate physical activity in the student will find physical activity a worthwhile management system.
References


