

PSYCHOMOTOR LEARNING AND RETENTION  
RELATIVE TO THE PRESENCE OR ABSENCE OF A  
BEHAVIORAL OBJECTIVE

by

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## DEDICATION

This paper is gratefully dedicated to Mrs. Barbara Howard, former instructor and longtime friend. Without her encouragement my master's degree program, of which this thesis is a part, might never have been undertaken.

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## Chapter 1

### INTRODUCTION

A recently published methods book for prospective teachers suggested that the primary purpose of teaching is "to facilitate student learning." (10:4) When slightly altered, this statement could describe the functioning teacher as one who aids student learning. Learning has been defined as a relatively constant modification of student behavior. (19:8) Evidence of this change can be seen in the overt behavior of the learner. (10:83) The principal function of the teacher, therefore, is to first determine how student behavior should be modified (what should be learned) and second, to select activities which help the student learn to perform accordingly. Once the teacher has decided what is to be learned, it is entirely possible that since not all students react to the same stimuli the teacher will need to use a variety of activities to induce a specific behavioral change in students. (18:1) The selection of activities can best be accomplished when teachers have a clearly defined statement of the outcomes they hope to achieve. (23:104) Educators have generally referred to these statements as behavioral objectives.

The uses of behaviorally-stated objectives have been divided into two categories: benefits to the teacher and benefits to the student. Benefits to the teacher include:

(1) providing a public record of what is to be learned, (2) aiding in the selection of activities, and (3) aiding in the selection of evaluation techniques.<sup>(1:46)</sup> These factors appear likely to benefit any teacher, regardless of the subject matter being taught. The need to be able to explain what is to be learned, to select teaching activities, and to select evaluative techniques are essential steps in any teaching process.

As an aid to the student, behavioral objectives have been described as a method to inform the learner of what is expected of him.<sup>(1:46)</sup> While this appears to be an important function of the behavioral objective, many educators have not agreed. Numerous arguments have been advanced against the practice of providing learners with behavioral objectives. Most of the arguments concerning the use of behavioral objectives as a teaching aid have been centered on their use with subject matter which generally have required cognitive processes. In addition to the theoretical and philosophical arguments, research has been conducted to determine the effects of behavioral objectives. Most of these studies have, however, also been confined to cognitive subject matter. This research has not proven conclusive. Questions still remain concerning the value of providing students with specific behavioral objectives. Do students necessarily learn better when they receive behavioral objectives which describe the exact behavior they are expected to demonstrate? Can the type of activity

affect the value of behavioral objectives to the learner? Will behavioral objectives aid the student in learning a psychomotor skill? Does the intelligence of the student influence the effect of the behavioral objective? Can retention be facilitated by the use of behavioral objectives?

#### PURPOSE OF THE STUDY

No doubt many similar questions have prompted the study of the effects of behavioral objectives on students. A variety of subject matter areas have been used in studies with students of all ages. Unfortunately, the results of these studies were not conclusive. In some cases behavioral objectives appeared effective as an aid to learning; in others they appeared to merely be an ineffective device. A few researchers even concluded that the use of behavioral objectives may possibly have been a hindrance to learning. Further, most studies were based on cognitive learning. Only limited research has been found which studied the effects of behavioral objectives in the area of psychomotor learning.

This study was conducted to compare skill development in students who had been given prior knowledge of specific behavioral information with skill development in students who had not received this information. Students were divided into three mental ability levels; high, middle, and low to discover if there was an interaction between mental ability and the effectiveness of the behavioral objective. Finally, the effect

of the behavioral objective was assessed by both an immediate and a delayed post-test of psychomotor performance.

#### IDENTIFICATION OF THE PROBLEM

This study examined the effect of behavioral objectives in physical education. Specifically, students were evaluated on their footwork while performing a tennis backboard test. Of the students evaluated, one-half received a behavioral objective which described the expected performance while the other half received a placebo statement. Data obtained for this study was analyzed in an attempt to answer the following questions: (1) did the use of a behavioral objective aid in learning a motor skill? (2) did the mental ability of the student influence the effectiveness of the behavioral objective? (3) did knowledge of the behavioral objective aid in the retention of that skill? and (4) did mental ability interact with the behavioral objective to influence retention?

#### THE HYPOTHESES

In an attempt to answer the preceding questions, four hypotheses were developed: (1) students who receive a behavioral objective defining a psychomotor skill will perform better on a test of that skill than will students who do not receive the behavioral objective, (2) within each of three mental ability groups; high, middle, and low, students receiving the behavioral objective will perform better than students not

receiving the behavioral objective, (3) students who receive a behavioral objective defining a psychomotor skill will perform better on a delayed retest of that skill than will students who do not receive the behavioral objective, and (4) within each of three ability groupings; high, middle, and low, students receiving the behavioral objective will perform better on a delayed retest of that skill than will students who do not receive the behavioral objective.

#### DEFINITION OF TERMS

The definitions which follow were used throughout the remainder of the paper.

##### Behavioral Objective

The term behavioral objective was defined as a written statement including the identification, by name, of the type of behavior accepted as proof that the learner had achieved the objective, and the conditions under which that behavior is expected to occur. Since evaluation was not a factor of the study, no provision was made for the behavioral objective to include the minimum performance acceptable, even though this is often listed as one part of a behavioral objective.

For this study, the acceptable behavior was placement of the feet parallel to the backboard as each hit or attempted hit was made. This behavior was expected to occur on all hits which were attempted by the student while she was being tested.

### Skilled Motor Performance

The term skilled motor performance was defined as student practice and execution of a psychomotor skill as it was described in the behavioral objective and as it was presented in a lecture-demonstration by the instructor. In this case, the psychomotor performance was footwork in backboard tennis play.

### Mental Ability Level

The term mental ability level was defined as one of three levels to which students were assigned based on results of the Otis-Lennon Test of Intelligence. The range of average mental ability in this study was 109 to 119. High mental ability was considered as 120 or above, while low mental ability was considered 108 or below.

### Skill Retention

The term skill retention was defined as performance on a retest of the original skilled motor performance. In this case, the retest was a second test of the students' execution of footwork in backboard tennis play.

## Chapter 2

### REVIEW OF LITERATURE

In the past few years much has been written, both in favor of and in opposition to the use of behaviorally-stated objectives as a means of identifying for the learner what he should be able to do after exposure to an educational program. Opponents of the behavioral objective approach have advanced many sound arguments against their use. But, for each of these arguments proponents of the behavioral approach have advanced what are probably equally sound counter-arguments. These arguments, however, did little toward providing a satisfactory solution to the question of whether or not behavioral objectives were an aid to learning. Some educators, instead of merely joining the debate, have conducted research into the effectiveness of behavioral objectives. These studies have provided fuel for both sides of the argument. Both theoretical arguments and research evidence concerning the effects of behavioral objectives have been included in the following discussion.

### THEORETICAL CONSIDERATIONS

About five years ago James MacDonald and Bernice J. Wolfson published an article which exposed what they felt were the major shortcomings of behavioral objectives as they were

generally being used. By their own admission, MacDonald and Wolfson's position was not entirely "anti-behavior." (17:119) Indeed, they agreed with the theory of using pupil behavior as a significant basis for decision making. They did disagree, however, with the idea of providing students with behavioral objectives as a means to improve learning. In their disagreement they question whether performance itself was an acceptable criterion of learning. In expressing this point of view they stated that "when hoped-for behavior occurs, it is often assumed that learning has taken place. But one must ask whether the effects are lasting and under the control of the learner or whether the teacher must continue to be present to control the consequences." (17:120) In short, did students learn the teacher instead of learning the material? A second major limitation of behavioral objectives noted by MacDonald and Wolfson was the fact that behavioral objectives may place so much emphasis on the parts that the whole is lost. (17:121) They used reading as an example of the whole being more than the sum of its parts. To them it seemed obvious that "the ability to read is not simply the sum of word-recognition skills." (17:121) MacDonald and Wolfson also contend that "individual differences are ignored by attempting to obtain the desired behavior from all." (17:122) This they felt occurred because behavioral objectives specified only what the teacher expected the students to be able to do, leaving no room for individuality. Further, according to



these writers, behavioral objectives may stifle incidental and unplanned learning that may have occurred as a result of the interaction of students and teachers within the assigned activity. (17:124) MacDonald and Wolfson conclude that behavioral objectives may be "inadequate and restrictive to the educational function of schools." (17:127)

An article authored by Richard H. Hersh and Stuart J. Cohen appeared shortly after the MacDonald and Wolfson article which attempted to refute the arguments previously advanced against the use of behavioral objectives. In contrast to the idea that overt behavior is not necessarily indicative of learning, Hersh and Cohen suggested that the sampling of pupil behavior in different settings would eliminate the possibility of artificial responses. Further, they contended that when teachers provided behavioral objectives, students could devote less time to "learning the teacher" and more time to attaining the stated goals. (9:434) Hersh and Cohen addressed themselves only indirectly to the problem of student individuality and the part-whole questions when they included a model of a behavioral objective which they felt required more than a simple, rote-stated response. (9:437) Their response to the MacDonald-Wolfson inference that objectives may spring from interaction of students and teachers within the activity is simply labeled as "hocus-pocus." (9:436) They considered students generally incapable of selecting or generating appropriate instructional objectives. In closing,

Hersh and Cohen use an old cliché to argue that although preparing behavioral objectives is a time-consuming venture, it is a worthwhile one. They stated "that the effort to clearly define and assess our instructional goals is not only worth doing, but worth doing well!"(9:437)

In a February 1968 presentation to the Annual American Educational Research Association, W. James Popham discussed eleven arguments which have been advanced against the use of behavioral objectives. Several of the arguments he presented were similar to those advanced by MacDonald and Wolfson. One argument advanced at the symposium was that "measurability implies behavior which can be objectively, mechanistically measured; hence there must be something dehumanizing about the approach."(25:68) To this Popham replied that when evaluative techniques more sophisticated than the quantitative result of a multiple-choice exam are developed the learner will no longer be reduced to merely "quantifiable bits of data."(25:68) The use of behavioral objectives should make the identification of alternate methods of evaluation possible. Popham also cited the argument advanced in 1964 by Arnstine that "it is somehow undemocratic to plan in advance precisely how the learner should behave after instruction."(25:69) He then turned to Komisar and McClellan, 1965, for refutation of this argument. These writers pointed out that instruction is, by its very nature, an undemocratic process. The teacher almost always selects goals and activities for the class. They also pointed

out that this is merely an extension of a society which constantly decides what its young are to do. A third argument discussed by Popham was the fact that behavioral objectives seem much harder to generate for some subject areas than for others. Although he agreed that this was probably a valid argument, Popham told educators in these areas that "the difficulty of the task should not preclude its accomplishment." (25:71) He pointed out that there was no excuse for avoiding the task. Essentially the same argument was used to refute the suggestion that precise behavioral objectives are harder to generate than the vague objectives often prepared by teachers. In closing his presentation, Popham conceded that most arguments against the use of behavioral objectives did contain some truth. But he insisted that these objections were not of sufficient strength to prevent the careful preparation of behavioral objectives in all curricular areas. He concluded that "any risks we run by moving to behavioral goals are miniscule in contrast with our current state of confusion regarding instructional intentions." (25:72)

Writing on another occasion Popham concluded an article with the suggestion that the decision to use behavioral objectives was not a radical choice. In his words, "all it suggests is that you want to be clear about your instructional intents." (23:110) Clarity of instructional intents is an aid to both teacher and student. As Richard K. Means stated "learning is most effective when the learning objectives and

philosophy of the program are planned and clearly understood by both the teacher and the student."(19:9) Popham strongly believed that behavioral objectives were the key to better understanding.

A 1971 article by Larry Frase and E. Gene Talbot was devoted to a discussion of the levels of response required by most teacher-prepared behavioral objectives. They noted that far too many teachers tended to generate objectives which required students to identify, list, name, label, or otherwise rote reproduce bits of factual information. Their resistance to this type of objective is that it does not demand any reasoning on the part of the student. Frase and Talbot included a model objective which they felt required the student to think. Their model objective directed the student to "generate a hypothesis."(7:85) They felt this type of activity would help students learn to make decisions, whereas rote responses would push students toward becoming "members of adult society [with] their minds ... molded like clay, never having been stimulated to judge and weigh."(7:85)

Very little has been written, either pro or con, on the use of behavioral objectives in the physical education setting. A statement in a recently published textbook on supervision noted that the evidence of learning can be measured by observation of student behavior. Learning was further suggested to be a relatively permanent change in behavior. Both of these statements seemed to be echoes of

statements made in general educational methods textbooks. In the case of physical education, learning can be observed by changes in the student's movement patterns, rather than in written test scores. (12:60-61) Because of the observability of movement, physical education may be a logical place to incorporate the use of behavioral objectives.

In an April, 1973 article Joe M. Shockley, Jr. advocated the use of behavioral objectives in physical education. One of his major arguments seemed to be that the use of behavioral objectives would "help the teacher and student focus in on the learning process." (27:44) This clarifying effect would supposedly make measurement more objective and thus reduce much of the ambiguity of evaluation in physical education. Although the Shockley article seemed to be open to most of the arguments which have been advanced against the use of behavioral objectives in cognitive areas, the article is not written from a defensive posture. In general, the article discussed advantages to the teacher from the use of behavioral objectives. It dealt with behavioral objectives as a tool to be used in up-grading the image of physical education programs. Shockly briefly mentioned one advantage to the student. According to Shockley, when behavioral objectives are provided students would know exactly what is expected of them. They would also be in a position to evaluate their own progress. Aside from this short discussion Shockley made no mention of benefits to the student. The

question of whether students would learn better or faster when provided with behavioral objectives was left untouched.

The arguments presented thus far have been rooted in educational philosophy and learning theory. They are discussions for educators, by educators. But what about the student? Surely before finally accepting or rejecting any technique there should be some student input into the question. An informal survey conducted recently by David Hayes and Amber Steinmetz uncovered the facts that students felt that behavioral objectives were (1) useful as a study aid, (2) helpful in understanding course material, and (3) an aid to attaining higher grades.<sup>(8:8)</sup> A similar, though more detailed, study by Tom E. Lawson revealed that students generally felt that behavioral objectives were (1) an aid to relevant learning, (2) an indication that the instructor was able to define what he expected, and (3) an aid to student attainment of instructional outcomes.<sup>(15:66)</sup>

Unfortunately neither of these studies gave any insight into the types of activities described by the objectives or why students seemed to approve of the use of behavioral objectives. Could it be as MacDonald and Wolfson suggested that students can "learn the teacher" more easily or that the behavioral objectives merely pinpointed facts to be parroted back without thought? Or, were objectives actually an efficient instrument in helping the student to learn? Whatever their reasons, students in these studies did

seem to favor the use of behavioral objectives.

While student opinion should be one consideration in an instructor's decision to use behaviorally-stated objectives, the final choice must depend on whether or not they facilitate learning. Results of empirical research should aid teachers in making the decision to, or not to, use behavioral objectives.

#### EMPIRICAL IMPLICATIONS

The effects of behavioral objectives on learning of cognitive materials has been studied in a variety of situations. The results of these studies did not, however, indicate either support or rejection for the use of behavioral objectives in the classroom. Rather, the inconsistency of findings indicated that further research in the area of behavioral objectives was needed.

#### Studies Which Supported the Use of Behavioral Objectives

In 1973, Schuyler W. Huck and James D. Long studied the effect of the use of behavioral objectives in the college setting. (11:40-41) They divided a class of basic educational research students into two sections. One group received behaviorally-stated objectives for the day's lesson, while the remaining group met briefly in an adjacent room to discuss a previously completed examination. The two groups were then reunited and all students heard the same lecture. At the