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ABSTRACT

External reinforcement paradigms are useful and necessary in a complete instructional system and external reinforcement is not antithetical to a belief in an intrinsic motivation hypothesis. Teacher training, parent education, and classroom management, as well as complex learning sequences, can be improved by the use of principles emerging from the experimental analysis of behavior. Teachers especially need to pay attention to all the variables which mediate their effectiveness with children. It is time to interrelate learning and developmental principles from differing points of view which have met the empirical test of effectiveness. On the whole, the approach to instruction required by the systematic use of external reinforcement can strengthen systems derived from other theories. (WY)

THE VALUE OF CLASSROOM REWARDS IN EARLY EDUCATION

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"We're really believers in intrinsic motivation -- the personal search for meaning rather than in the behavior modification or external reinforcer. No kid ever needs a raisin, an M & M, or what have you, for doing anything; being able to do is its own reward." (Maccoby & Zellner, 1970, p. 61). An advocate of early education based on Piagetian principles made this statement in the context of discussions concerning motivation and incentives in programming for young children. Certain basic assumptions, and some misunderstandings underlie such statements. It is my contention that the arguments generated around the issues of incentives and motivation in early education are artifacts of these assumptions and misunderstandings. As a scholarly method of pointing up issues for research these arguments are appropriate. As a means for persuasion to one point of view or another however, the arguments are preventing some Piagetians, Open School advocates, behavior analysis exponents, direct instructionists, Montessorians, responsive environmentalists, traditionalists, and others in the field of experimental early education from engaging in the proper study and use of strategies, concepts, and objectives across systems.

The quotation at the beginning of this paragraph implies that the person who advocates the use of behavior modification strategies does not include the learning of self-motivation techniques as an objective. This reflects a lack of understanding and an assumption that is not warranted. When such statements lead to hard-line positions which prematurely exclude from consideration one or another approach, the result is much less effective programs than those which we are capable of producing.

One of the major disagreements in early education is centered mainly on the concepts of intrinsic motivation as a sought for goal as opposed to extrinsic reinforcement as a strategy. Those who approach early education from a cognitive-developmental, open school, or more traditional position say that they believe in intrinsic motivation and that extrinsic reinforcement is not necessary for the development of such internal states of motivation. Those who are programming from a behavior analysis or direct-instruction position, on the other hand, depend heavily on extrinsic reinforcement as a major variable in learning and say little about motivation as an internal state. (It should be noted that the lack of explicit statements concerning motivational hypotheses does not necessarily preclude self-directed behavior as an objective)

The thesis of the present paper is that experimental early education requires careful empirical analysis of all possible applications of theory to the solution of instructional problems with young children. Ample evidence exists that systematic external reinforcement systems applied to a wide range of problems such as the development of positive behaviors as well as the reduction of negative behaviors have been, on the whole, moderately successful (Evans, 1971; Hanley, 1970; Hartup, 1970; Lovett, 1970; MacMillan & Forness, 1970). These systematic approaches have apparent benefits for teachers, parents, children, and educational programmers.

This paper is concerned only with the potential benefits for teacher and child in the classroom. It will be pointed out that one at the main benefits is the potential for combining program components from reinforcement approaches with other models of early learning. It appears to this writer that the systematic reinforcement approach is the most likely candidate for strengthening systems derived from other theories.

Furthermore, the adherence to a single model at the expense of any consideration of alternative features of other models is an example of the all-or-none fallacy presently encountered in the early education literature (Hodges, 1970). This fallacy is evident when programmers ignore potentially effective alternative and complementary strategies on an a priori basis largely because of misconceptions, hero worship, false idealism, or cultism. The all-or-none fallacy is even more apparent when there is an insistence on cognitive instead of direct instructional approaches, or open schooling instead of behavioral approaches, as if any combination of these approaches would contain totally mutually exclusive features. Any instructional system must include, 1) the conditions necessary for engaging the child in learning (willfully); 2) the organization of that which is to be learned; 3) the sequence of learning; and 4) the kinds of timing of reinforcement (Rohwer, 1970). Early childhood approaches deal with each of these features with different degrees of sophistication. Some tend to exclude one or more of the basic features. It is, therefore, highly important to destroy the idea of mutual incompatability and examine strengths and weaknesses for possible matches.

Bijou and Baer (1967) come close to admitting that the concepts of operant and respondent conditioning fall short of a complete theory of instruction when they refer to it as "A Segment of a Theory" (;. 335). After presenting an outline of eight major points of behavior theory they conclude:

> "Even from this sketchy outline, it should be clear that, in number and range of application, the basic principles are adequate to describe much of the development discussed in child psychology." (p. 336)

Even though Bijou and Baer have difficulty finding anything that behavior theory cannot explain, it is clear that the theory is not sufficient to generate a complete instructional system which takes into account the acquisition of rules and problem solving skills. In addition, "the reinforcement theory underlying research in this area does not contain any basis for selecting those behaviors that should be fostered...." (Hartup, 1970). The benefit of systematic external reinforcement is in conjunction with other systems as a process, a methodology, and as an analytic tool for discovering more about instructional processes not as a total system. I point these things out not to suggest any weakness of the approach, but to indicate that it is one of the more powerful analytic tools available to aid in the design of instructional models. As ellis Evans (1971) points out: "....consequences do follow behavior; applying operant procedures to education is simply an attempt to

make the consequences positive rather than negative, or effective rather than ineffective." (p. 191). It should be added that the approach not only make the negative positive and the ineffective effective, but it also makes classroom behavior explicit and the evidence available.

It is resonable to assume that the study of various models of early education using the analytic capabilities of reinforcement principles can provide a common basis for understanding all approaches better. For example, the behavioral analysis of open school classes can yield data which will make the critical variables of that system more obvious than they presently are and which can be useful in designing more effective ways to implement open school principles. The observation and systematic use of the external reinforcers which naturally occur in a cognitive-developmental program will yield ways to move children even more rapidly into self-management skills which will enable them to take greater advantage of the rich learning opportunities available. And, while not directly addressed in this particular paper, there is much that those who use behavior analysis need from other models in the formulation and selection of goals and objectives.

Let us now return to the initial issue with two definitions. Intrinsic motivation is usually thought to be learning for learning's sake. It is in evidence when children voluntarily explore new learning situations (curiosity), maintain attentiveness (a basic self-management skill), and act upon available stimuli without evident prodding, cajoling, or reinforcing on the part of other persons, objects, or events. Extrinsic reinforcement, on the other hand, is the audible or visible feedback, verbal approval, or concrete object made available, contingent upon the performance of a child in response to the stimulus situation. It must result in an increase in response probability. (External reinforcement is not limited to an act of a person, and can be delivered automatically by machine or material). The issue, in its simplest form, is whether systematic external reinforcement reduces the probability of the development of intrinsic motivation, not whether intrinsic is better than extrinsic motivation.

These definitions point up one of the difficulties in resolving the impasse between those who believe that extrinsic reinforcement is useful and those who believe it is useless or harmful. As defined, intrinsic motivation is most parsimoniously thought of as a sought-for goal of early and later education while external reinforcement is one of a large number of potentially useful strategies in instruction and learning. Clarifying this difference points up the fact that the issue is basically one that cannot be resolved in the absence of empirical evidence on the effectiveness of the strategy in attaining the goal without detrimental side effects, such as an increase in dependence on external rewards.

At this point in time it is not possible to completely resolve the issue. Insufficient evidence is available. There is, however, an answer to the dilemma. Most advocates of external reinforcement systems begin

by applying the minimal amount of reinforcement necessary to obtain results. They then design ways of reducing the incidence of external reinforcement as the learning becomes more stable and less susceptible to extinction. This is a positive feature of external reinforcement systems. There is no assumption that a reinforcement dependency will develop. The systems in use, however, have an explicit schedule for changing contingencies based on the dimensions of concreteness of reinforcement and the ratios or intervals of reinforcement. These changing contingencies should prevent the development of dependence on rewards or reinforcements by the child.

Need for Differentiating use of External Reinforcement

Is it necessary to include consciously applied and systematic external reinforcement in an early education system? This question becomes one of when rather than whether external reinforcement is necessary. The evidence indicates that for certain types and in certain stages of learning external reinforcement is a necessary, even if not a sufficient condition for learning (Gagne', 1970). There is no reason to expect that is reinforcement is necessary it should not be applied in accordance with available principles. External reinforcement is most obviously helpful when the learning to be accomplished is of the very basic nature described by Gagne' (1970). According to Gagne's analysis, both the learning of signals and stimulus-response connections are dependent upon certain learning conditions, including reinforcement. Motor and verbal chains are also dependent on reinforcement. In addition, Gagne's model of hierarchical learning suggest that signal learning, association, and chaining are types of learning which are prerequisite to the learning of concepts, rules and the development of problem solving strategies.

Much of school learning is of these more complex concept and rule types and if Gagne' is correct, they are not directly dependent on the principles of systematic external reinforcement. It is, however, apparent from any analysis of the behavior of young children that even at the time they enter school there are stimulus-response connections, motor, and verbal chains to be learned as precursors to the more complex concepts, rules, and problem solving strategies. The benefit of external reinforcement is apparent. It is an essential element for some kinds of learning. The task for the teacher is to determine the type of task that the child is trying to accomplish before deciding what kind of feedback must be made available.

Conditions other than external reinforcement are necessary for other types of learning. Behavior analysis has helped to make this fact clear. Skinner (1968) agrees with this point when he indicates that "The human organism does, of course, learn without being taught. It is a good thing that this is so, and it would no doubt be a good thing if more could be learned in that way. Students are naturally interested in what they learn by themselves because they would not learn if they were not, and for the

same reason they are more likely to remember what they learn in that way. There are reinforcing elements of surprise and accomplishment in personal discovery that are welcome alternatives to traditional aversive consequences. But discovery is no solution to the problems of education. The individual cannot be expected to rediscover more than a very small part of the facts and principles that have already been discovered by others. To stop teaching in order that the student may learn for himself is to abandon education as a medium for the transmission of the accumulated knowledge and wisdom of a culture."

Implied in Skinner's discussion is the agreement that experimental analyses and the application of consequent reinforcements in a learning system do not account for all types of learning or for all the ways in which people are motivated to learn.

A Supplement to Other Instructional Systems

The systematic use of external reinforcement based on the type and stage of learning is an appropriate supplement to the attainment of explicit objectives as well as the goals of other early education instructional systems. The strength of behavior analysis is as a method, as a set of strategies for helping children move from one point of development to another, rather than as a philosophical system or theory of instruction (Scott, 1970). The technological elegance of the approach has much to commend it. It is communicable. The evidence for effectiveness and the clarity of procedures for attaining additional evidence in field settings is impressive. None of these points is sufficient, however, to claim more for the approach than should be claimed. It is also important to prevent the rejection of the tool for irrelevant reasons.

An Aid to Developing Prelearning Skills

Of particular interest to those engaged in early education are the very basic prelearning capabilities included in Gagne' (1970) analysis of the conditions of learning. These prelearning sets of attention, response, order, and exploration are learned primarily through the application of external reinforcement conditions. Since in many classes or situations where young children are enrolled these prelearning attentional sets are not already established they may be developed and enhanced by the careful use of external reinforcers. Assuming that these basic skills will develop in the natural course of events may be playing a devastating waiting game for the child.

Facilitating the Emergence of Creativity

The emergence of creative, self-evaluative, self-propelled, curious behavior probably depends on the rapid, early, and relatively painless accumulation of a repertoire of early learnings. These include the prelearning capabilities, affective responses to learning, and a wide range of

common connections and chains of associations. The most direct approach to these types of learning is through systematic external reinforcement. The propitious thing to do in early education, then, is to see that these sets, capabilities, and associations are directly and efficiently programmed so that all children have a starter set of skills and attitudes. With these responses, associations, and chains well established much can be done to enhance exploratory and creative behavior built on these prior learnings without undue concern for conscious external reinforcement. The less responsible procedure is to disallow the conscious and systematic use of the powerful tool available for facilitating these early learnings. To leave these basic types of learning to the natural consequences of home or school environments may be to allow children to learn superstitious fears and erroneous associations that will interfere with the acquisition of later, more complex behaviors,schemas, and intellectual processes.

A Supplement to Other Sources of Motivation

The use of external reinforcement as a group of strategies for aiding and abetting learning does not imply a denial of internal sources of motivation. Children of preschool and primary age levels are typically curious, probing, and searching beings. Only when working with exceptional populations and in the later grades of school does it become apparent that something has happened to reduce interest and enthusiasm for school learning. In other words, some sort of negative emotions are signaled by those stimuli surrounding learning in school situations. With children who have learned these negative sets toward learning, the application of external and even concrete, palpable reinforcers on a systematic basis is the only known recourse short of expensive, demanding, and often inaffective theraputic approaches. But even for the majority of younger children the most explicit way to insure that basic self-management skills are learned and curiosity drives sustained is through externally reinforced positive responses to learning. Such an approach does not contradict intrinsic motivation which may be based on innate exploratory drives, a theory of drive reduction, perceptual incongruence, or a competence motivation hypothesis. Quite the contrary, it is just as logical to assume that appropriately applied external reinforcement will maintain and enhance the behaviors resulting from these sources.

External reinforcement occurs after the response in a learning episode. The theories of innate exploratory drives, competence motivation, perceptual incongruence, and so on attempt to explain why a child responds at all prior to the reinforcement. These conceptions of reinforcement and drive may well be complementary rather than mutually exclusive. A well articulated theory of perceptual incongruence can help with the design stimulus displays while the concepts of external reinforcement can help with the selection of consequent stimulus.

Improving the Affective Climate

External reinforcement in the classroom is a direct help in correcting affective deficits and punitive approaches in classroom management. This benefit is largely a result of the existing situation in preschool and primary classes and is not exclusively a feature of external reinforcement systems. Most of us have had the direct experience of observing in classrooms where external verbal "reinforces" are indiscriminately dispensed for both correct and incorrect responses. Children fortunate enough to receive enough of these following a correct response probably learn an appropriate association. Other children who respond incorrectly learn an incorrect association.

In addition to the indiscriminate use of verbal reinforcers some children sit in class for long periods of time with little, if any interaction with the teacher. Teachers use a greater proportion of disapproval than approval, even in Head Start classes (Meyer & Lindstrom, 1970). A systematic application of a basic set of rules, the ignoring of certain classes of inappropriate behavior, and the explicit external reinforcement of rule following behavior can do much to correct these defects in classroom climate. When a system is invoked, the teacher attends to all children, increases positive statements, and reduces punitive acts. Under any system of early education there are certain gound rules which can be effectively designed and followed, with the children's help. External reinforcement procedures are helpful largely because of the clarity of rules and the explicitness of consequences, - consequences which are not, by and large, punitive.

A Guide to Teacher Behavior

Another benefit of the use of external reinforcement paradigms is that they provide the teacher and parent with communicable strategies for guiding their own behavior. These strategies are more explicit than most and, therefore, the potential for learning them is greater. Providing these tools for behavior change has the potential for helping teachers and parents develop positive coping behaviors and allow them to provide more instructional opportunities.

Implementation of reinforcement systems sensitizes teachers to the effects of different reinforcers for different children. This is certainly one way that the long sought, but rarely attained accommodation to individual variation can make a difference in the interactions of teacher and child. The debunking of grades as universal reinforcers of such great repute may alone be worth an investment in an external reinforcement paradigm. As a side benefit some teachers discover why they are not effective as social reinforcers for children and can modify their own behavior to become valuable sources of guidance, information, and reinforcement. Such discoveries and the consequent changes can make in-service teacher training relevant to the needs of children.

Knowing What Turns Children On

The search for those events which are reinforcers for a child is a potent benefit. Since systematic reinforcement depends on the discovery of those events which increase the rate of responding of a child, the teacher must engage in the search for appropriate reinforcing stimuli for each child. This search is in reality an empirical approach to the study of those stimuli which keep children learning. Any system which can help teachers engage in this kind of behavior will positively affect instruction, if not achievement. The fact that the teacher, as a result of the search for reinforcers, is continuously involved in the evaluation of the instruction that is being conducted in her classroom is an additional benefit. This requires observations of children directed at the relationship of observable behavior to desired behavior.

Child Analysis

The appropriate application of reinforcement in the classroom requires that the teacher know quite well the response repertoire of the children under her guidance. Without this knowledge, the teacher is unable to know what responses are to be reinforced early in learning and has no way of scaling down the response requirements for a child. Knowing the initial set of responses available to a child means that the learning situation can be designed to elicit responses from the child which do not exceed his individual repertoire, -- not that of the whole group. This is certainly part of what is implied in the concept of individualizing instruction.

Requires Objectives

The use of a systematic system of external reinforcement requires the explicit understanding of the desirable behavior to be sought. That is, there must be a set of objectives in sufficient detail to enable the teacher to properly arrange for the reinforcing stimulus events. This is a great benefit compared to what presently exists in the school situation. Apparently some people believe this point is the most objectionable one of the behavioral analysis position, and too much power is put in the hands of the classroom teacher. The program does not follow the lead of the child because of predetermined objectives. But neither of these arguments is a necessary drawback of a reinforcement system. Individual teachers should not be the sole source of the rules of classroom behavior nor of the learning objectives for children. Classroom rules can and should be determined with the aid of children. Nursery and kindergarten children can help in the formulation of understandable and usable rules. Learning objectives should be derived in the broader context of child development and social presses for certain kinds of achievement. It is more dangerous to leave the objectives to textbook writers and program developers than it is to design a system for the development of objectives which includes children, community, teachers, and scholars. The systematic application of

reinforcement principles in the classroom does not negate practices such as these just suggested.

A Focus on Behavior

A teacher using external reinforcement as a systematic classroom procedure is focussed on the behavior of the child - on what he does, not what he is or is thought to be. Searching for reinforcers, evaluating progress in relation to visible behaviors, monitoring specific learning - each of these takes the place of explaining away a lack of learning on the basis of normative data or on some post hoc analysis of an internal state of the child. "His I. Q. is too low to expect him to do much." or "He simply has no desire to learn!" These statements have no place in a learning system and reinforcement paradigms are designed to prevent them.

Analyses of learning difficulties, using behavior principles demonstrate that a lack of reinforcement and proper programming is more often the reason for failure than is a deficiency of the child. This point of view, while not peculiar to reinforcement systems, clearly puts the responsibility for resetting the stage for learning on the teacher.

Guide to Complex Learning

The benefits of external reinforcement are not limited to the problems of classroom management. There are basic applications to be made within the instructional tasks of children. It has already been noted that external reinforcement is a necessary condition for certain basic, and essential types of learning: signals, stimulus-response connections, and chains. The uses of external reinforcement to maximize concept formation, rule learning, and problem solving behaviors and strategies are not so clear. But external reinforcement can be used to aid the learning of these higher order intellectual processes, particularly as a guide through these more complex chains of learning events. That is, external reinforcement can play a part in keeping children on track in problems involving a series of steps, each linked sequentially to the preceding one. External reinforcement in these situations is not necessary for learning, but is used as a facilitator for maintenance of attention and perseverence. It should be noted that the use of external reinforcement as a guide for children is not limited to behavior analysis classrooms, but is appropriate in learning episodes in any system of instruction.

Maintenance of Effort in Unpleasant Tasks

From preschool through the primary grades and into the classes of college students there are always certain essential but unpleasant facts, strategies, or skills that have to be learned to enable a child or student to progress. Some of these tasks have no inherent incentive powers, and are typically learned without great affect. It seems appropriate under these conditions to employ the most effective external reinforcers

available in order to carry students to higher levels of performance (which they can do on their own having acquired these less exciting facts or skills)

Summary

On the whole then, the coldly scientific approach to instruction required by the systematic use of external reinforcement includes most of the truly humane features suggested by many education writers. Nothing is assumed about children in general, or about particular children, except that all of them can learn. Categorical labels derived from norm based testing are rejected as being useless. Therefore, children are spared from some of the expectancies of people consequent to being labeled retarded, emotionally disturbed, hyperactive, brain-damaged, and so on. Teachers are not led to believe that their smile is automatically an event valued by all their children. Causes for failure to learn are looked for in the learning situation provided by the teacher, instead. Teachers must pay attention to all of those variables which mediate her effectiveness with children. The consequences of teacher-child interaction are spelled out in the principles of operant behavior and checked out empirically by the practitioner in the natural setting of the classroom (Evans, 1971).

In a brief time I have suggested that external reinforcement paradigms are useful and necessary in a complete instructional system. The behavioral analysis approach is not sufficient for a complete instructional system. External reinforcement is not antithetical to a belief in an intrinsic motivation hypotheses. Teacher training, parent education, and classroom management, as well as complex learning sequences can be improved by the use of the principles emerging from the experimental analysis of behavior. The time to interrelate those learning and developmental principles from differing points of view which have met the empirical test of effectiveness is at hand.

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