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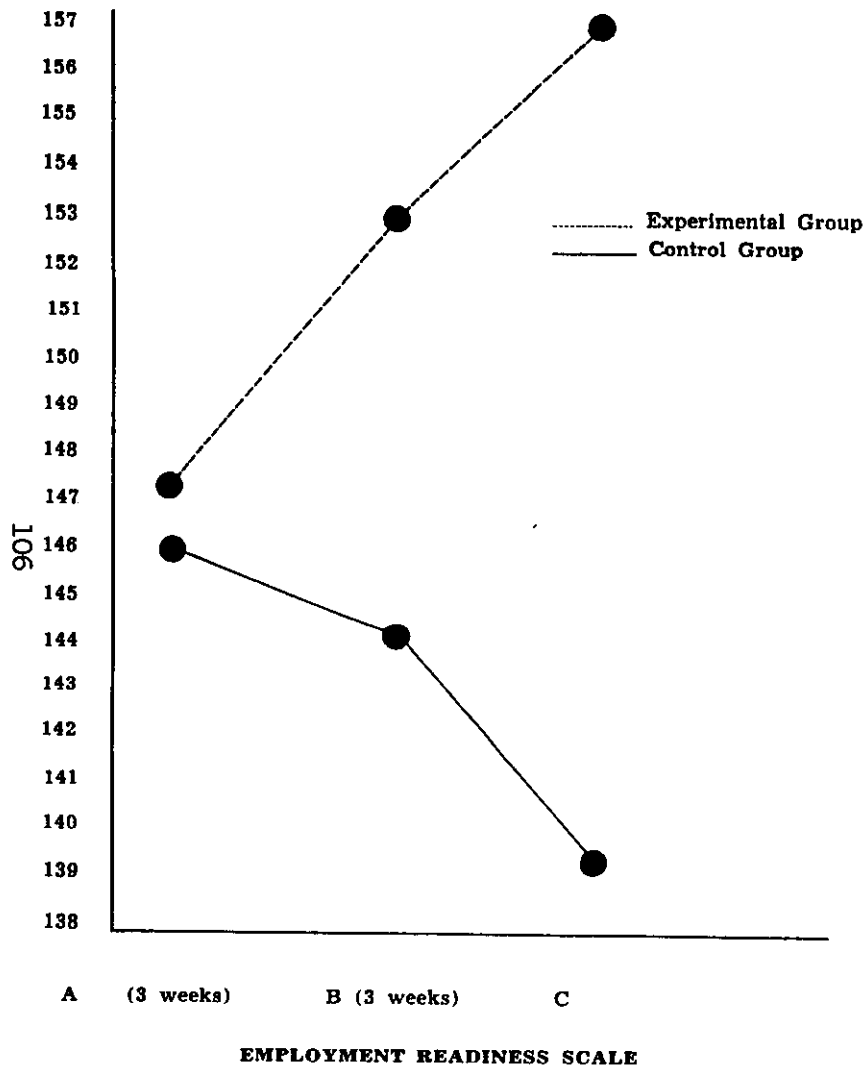


FIGURE 2
 Mean Scores of Experimental and Control Groups on Scales A, B, and C

jects were involved in the rehabilitation setting that emphasized work adjustment with the continuous application of production pressures, the more positive their attitude toward employment became. Conversely, the attitude toward employment of subjects not involved in rehabilitation activities became increasingly negative in relation to time. However, it is possible that the lower scores received by the control group on the ERS might be, in part, due to a general dissatisfied attitude as a result of the limited rehabilitation services being provided to them at that time. Further research is necessary to address these concerns and to verify the results and conclusions drawn in this study.

In summary, it may be inferred that clients who need the services provided by rehabilitation facilities should be involved in facility activities as early as possible. An inordinate delay in referral of the client to the facility may adversely affect the probability of rehabilitation success.

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Extrinsic Reward and Intrinsic Motivation: the vital link between classroom management and student performance

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ABSTRACT *This article presents a survey and synthesis of literature on the short-term and long-term effects of extrinsic motivation on student performance and subsequent intrinsic motivation. The motivational contexts of extrinsic rewards, including classes of harmful effects and crucial motivational variables, are examined with the purpose of helping teacher educators recognize and avoid the potentially harmful effects of poorly-designed reward systems.*

INTRODUCTION

Of all the concerns the classroom teacher has for enhancing student learning, perhaps none is more critical than striking a balance between external control and internal motivation of students. The two major terms in this paper, intrinsic motivation and extrinsic motivation, are broadly defined in accordance with their usage in current research as follows.

(1) Intrinsic motivation denotes the personal aspects of motivation that originate within the individual and which are subject to the individual's volitional control to some degree. The close alliance of personal interests with intrinsic motivation is well-documented, and personal interests remain a major key to the intrinsic motivation of students. The motivational literature also relates intrinsic motivation to factors such as an individual's perceptions of personal competence and ability, and also to a sense of self-determination (Lepper, 1982).

(2) Extrinsic motivation denotes the external aspects of motivation which originate outside of the individual and which are not subject to the individual's volitional control. The studies addressed in this paper focus on external motivation in terms of reward systems designed to increase student performance. Several of these reward systems involve 'token economies,' which emulate the types of rewards available in an actual monetary system. The more subtle

determinants of external motivation include the locus of control phenomena (Brophy, 1979), which is affected by specific teacher actions and teaching styles.

As terms used to facilitate discussion in this paper, intrinsic motivation and extrinsic motivation are by no means mutually exclusive; doubtless there are varying ratios of internal to external motivation which simultaneously influence an individual in a given motivational context. Most important, the motivation literature does not support a direct cause and effect relationship between extrinsic reward and intrinsic motivation. Although the term extrinsic motivation is largely amenable to empirical definition and concrete examples, the term intrinsic motivation does not have a concrete, empirical referent. The term intrinsic motivation represents a hypothetical construct that in fact is considerably less tangible and definable, and whose theoretical function remains obscure. However, the use of this construct to represent the antithesis of demonstrable external motivational factors (intrinsic motivation) is essential to a balanced analysis and discussion of the research findings presented in this paper. The major thrust of this literature review and synthesis is an examination of the effects of external rewards on measures of performance and subsequent interest in a learning task with careful consideration of the implications of research findings for teacher education. A problematic part of this examination is the interface of various research findings from divergent disciplines. Throughout the 1970s, research in the broad areas of education and psychology has involved parallel and occasionally overlapping topics, although from different research perspectives. Thus, a particularly synergistic relationship exists between the parallel areas of research on the effects of rewards and locus of control theory.

Locus of control refers to whether an individual perceives outcomes as contingent upon his own behavior (internal control) or upon the agency of luck, powerful others, or other uncontrollable factors (external control). In a real sense, motivation theory (i.e. extrinsic/intrinsic motivation) and locus of control theory represent two hypothetical constructs or grids for the same phenomenon. Brophy (1979) and others have amply demonstrated that "locus of control" is at the heart of teachers' perceptions of classroom management concerns. In actual classroom practice, this means that a given teacher approaches classroom management from one of two primary conceptual stances: (1) the 'control' inherent in classroom management resides in the teacher and is characterized by external motivation, including the administration or withholding of rewards, or (2) the 'control' inherent in class management resides in individual students and is characterized by self-initiated, self-directed, and self-paced learning.

On this view, the concern over internal motivation by the student or external motivation by the teacher resembles the locus of control theorists' concern about whether the source of control in classroom management comes from the student or the teacher. The questions that are posed by superimposing motivation theory on locus of control theory are critical: (1) is it possible to match a student's locus of control with an optimum teaching style, and (2) under what circumstances should an attempt be made to shift a student's locus of control?

Research suggests that students having an external locus of control perform

measurably better with a highly-directive, externally motivating teacher (Trice & Wood-Shuman, 1984). Conversely, students with an internal locus of control perform better with a non-directive teacher who facilitates each student's inner motivation and interest.

The other side of the motivation/locus of control equation is that of the interaction between teachers' and students' loci of control. Cognitive evaluation theory (Rogers, 1985) holds that intrinsic motivation can be affected by a change in perceived locus of causality from internal to external. Teaching styles (Kourilsky & Keislar, 1983) and specific teacher actions can affect students' locus of control. In a study of the effect of locus of control in black college students, James (1985) concludes that the thirty-four participants in the study were more externalized in their thinking than internalized, high-achieving white students. A low correlation between the results of the Rotter Internal-External Scale and grade point averages for the participants in the study indicates that imposing internal control for black and other minority students in special programs would have implications for improved academic achievement. Evertson (1985) conducted a study which demonstrated that in-service training of secondary teachers in motivational techniques enhances student on-task behavior. With this training, teachers apparently use more questions that elicit rationales and higher order thinking skills.

The motivational issues regarding the effects of external rewards on intrinsic interest comprise the major focus of this survey of literature. An attempt is made to achieve a coherent view of divergent research traditions, with particular attention to the problem of deriving discrete research dimensions within a given area. In this process, dominant theories of motivation that have been used as a conceptual basis for research are examined. Crucial motivational variables are also examined, along with the potentially harmful effects of external rewards. Collateral areas of these relatively broad topics include the effects of subjects' perceptions on motivation, ulterior motivation, and the 'overjustification hypothesis'. Additionally, the determinants of intrinsic motivation as an organic human need are reviewed. Finally, a group of studies is reviewed which focuses on the effects of extrinsic reward on goals and approaches to an activity, incidental learning, and subsequent learning.

IMPLICATIONS FOR TEACHER TRAINING

An understanding of both motivational practice and theory is vital for teacher training, not only to guard against the 'indiscriminate' application of rewards cited by Rogers (1985), but also because—as Sharpley (1985) points out—theoretical constructs "are dramatically altered in the typical rewarding procedures adopted in many classrooms". Sharpley found that the outcome of a rewards strategy is affected by the social homogeneity of children's groups, and that children are capable of making evaluations of the relative worth to them of rewards and the likelihood of receiving those rewards in the future. For this reason, teachers should carefully consider the social dynamics of a class as a group, and the effect that the social differences between the group and individual members of the group may produce.

Creating a sociogram of a class would be very useful in graphically representing and understanding the social differentiation within a given group of students.

Teacher training institutions need to select, organize, and condense the most relevant and valid motivation research and incorporate this information into the teacher education curriculum. A highly participative, interactive curriculum that incorporated role playing and videotaped reviews of simulated teaching activities would be an optimum learning environment for heightening the awareness of potential teachers to critical motivational variables and contexts. Insight into the relationship between classroom management and appropriate motivational considerations could also be gained from a practicum. Thus, a bridge from theory to teacher knowledge to actual classroom practice could be built, with the ultimate goal of an enhanced classroom learning environment and consequent increases in student performance.

LITERATURE REVIEW

Lepper (1980) provides a brief historical overview of motivational practices in the USA. Prior to the advent of compulsory schooling, corporal punishment and other punitive measures were considered an integral part of the educational system. Negative sanctions were viewed as essential ingredients in eliciting compliance with classroom dictates and in maintaining 'interest' in academic pursuits. Only in the recent past have techniques of punishment in the school fallen into general disfavor, to be supplanted by an increased reliance upon more humane means of social control involving the use of contingent rewards and privileges to control behavior and to motivate academic performance in the classroom.

In the 1960s and 1970s social unrest and its subsequent impact on education have heightened issues of classroom motivation and conduct. As schools have come to rely more upon systems of rewards and principles of reinforcement to motivate and control students, debates on control and motivation have focused on how and when rewards may best be used to increase interest and enhance learning in the classroom.

Stimulated by these troubled times in American education, the last decade has witnessed the growth of two quite different and sometimes opposed research techniques—each concerned with the effects of tangible rewards on conduct, task performance, and subsequent behavior. Both of these research traditions have proven controversial and have been a source of considerable empirical research.

Divergent Research Techniques

The first of these techniques, popularly known as behavior modification, attempts to analyze and systematically alter the social contingencies prevalent in the classroom. This approach is best exemplified in the use of 'token economy' programs in school in which a system of highly attractive, extrinsic rewards is introduced into the classroom, with access to those rewards made strictly contingent upon specified desirable or 'appropriate' behavior patterns. Token economy systems have been

highly effective in decreasing disruptive and inappropriate behavior and increasing attention to (and occasionally performance on) academic tasks.

The second research technique, in marked contrast, focuses on the 'hidden costs' of rewards. This line of research has been less encouraging to the practitioner since it focuses on theoretical rather than applied issues. The last 10 years have witnessed the growth of a large body of literature that investigates the potential harmful effects of the inappropriate use of extrinsic motivation, effects that are perhaps more complex than have been realized (Lepper & Greene, 1978). These findings strongly suggest that the uncritical or inappropriate use of reward systems is not a panacea for problems of interest and motivation in the classroom.

Classes of Harmful Effects

The harmful effects of inappropriately using extrinsic rewards fall into two conceptually distinct classes—rewards that may have negative effects on measures of performance such as learning and recall, and those which have negative effects on subsequent intrinsic interest in or attitudes towards the activity. The existing studies suggest that these two classes of effects are at least partially independent. Condry & Chambers (1978) make a distinction between undermining intrinsic interest as opposed to undermining the learning process itself. Lepper & Greene (1978) focus on the process of learning and the manner in which this process is affected by the motivational context in which an activity is presented. Citing earlier research on the undermining effect of different kinds of reward (Smith, 1975) and of monetary incentives on different types of initial interest (Upton, 1974), Condry & Chambers most recently emphasize the process of task activity within the research dimension of 'motivational context' (Condry & Chambers, 1978). The rationale for this specific focus is highly significant: if rewards 'undermine' only interest, this effect would appear to be substantially less important than if the rewards 'undermine' the process of learning. For their research purposes, Condry & Chambers reconceptualize the popular term 'undermining':

We have assumed that rather than undermine anything, the offer of a reward acted as a 'signal' to the individual to call forth a given sequence of activity. Thus, task-extrinsic rewards are part of an informational array specifying the appropriate actions to take and perhaps the appropriate way to conceptualize the 'causes' of one's behavior. The absence of a reward as well as other aspects of the situation are part of an informational array we call a 'context,' which elicits a different pattern of motivated behavior.

This approach derived from one of the original findings (Lepper, Greene & Nisbett, 1973) that *unanticipated* rewards had no 'undermining' effect; Condry & Chambers would say that these rewards had a different informational value or meaning. Thus attention is diverted from reward *per se* and is focused on the entire complex of information addressed by the individual. Additionally, the motivational context approach avoids the either/or fallacy which conceptualized motivation as entirely intrinsic or extrinsic, a naive perception of the cause and effect relationship

between rewards and motivational contexts and what it can tell us. In contrast to this view, Sharpley (1985) examined the vicarious effects of implicit rewards on the peers of target students. He found that such rewards could act as extinguishers as well as reinforcers of behaviors, depending on whether they were applied before or after 'direct' awards.

Information-based Theory of Motivation

Condry & Chambers conclude that more research is needed on the three central questions they raise about an information-based theory of motivation: what information specifies control; how is it discriminated; and what are the behavioral and cognitive consequences of making this discrimination? Partial answers already exist for these questions. For example, certain kinds of information signaling the 'potential for self-control' include low environmental 'demand,' low arousal, high choice, freedom, a contingent relationship between effort and outcome, and apparent predictability of the events in the environment. When these conditions are met, people are active in their problem solving, choose more difficult problems, have greater confidence in the outcomes, direct attention to those aspects of the task relevant to the development of basic skills, and are more persistent in doing the task, and more willing to return to it than when these conditions do not apply. Deci's Cognitive Evaluation Theory (Rogers, 1985) takes this a step further, stating that every reward (including feedback) has two aspects, controlling and informational, and that the salience of one of these aspects will affect perceptions of locus of control and/or feelings of competence and self-determination.

The answer to the second question, how and when informational elements are discriminated, is essentially unknown. The working hypothesis that has been established is that the various 'reward' contexts studied thus far can be viewed as differential responses to the conditions or contexts involved. While rewards are powerful ways to control behavior, the consequences of this control are just beginning to be studied. At the cutting edge of continuing research is an individual's volitional 'control' of the motivation process within the dimension of a specified 'motivational context.'

Crucial Motivational Variables

Closely related to Condry & Chamber's research is a study by McGraw (1978). Derived from earlier work which viewed the apparently detrimental effects of reward as anomalies attributable to either task or procedural variables, McGraw's research is an attempt to make sense of the detrimental effect data by pointing to variables that appear crucial in determining whether incentives will enhance or hinder performance. From his review and analysis of relevant literature, the evidence of the detrimental effects of rewards appears to occur when two conditions are met: (1) when the task is sufficiently interesting for the subjects that the offer of incentives is a superfluous source of motivation, and (2) when the solution to the task is open-ended enough that the steps leading to the solution are not immediately

obvious. These conditions reduce to the requirement that the task be inherently attractive and have a heuristic, discovery-oriented solution.

McGraw concludes that the results of his study of the detrimental effects of reward on discrimination learning are only part of a larger picture. Additionally, evidence of detrimental effects of reward occurs in concept attainment, insightful learning, functional fixedness, incidental learning, and creativity tasks as well. Neither the age of the learners, the method of presenting the reward, the contingency of the reward on performance, nor the type of extrinsic reward appears to be a critical variable in producing a detrimental effect. Tiedemann & McMahon (1985) suggest that sex may be a more important consideration than age in determining students' responsiveness to rewards administered by adults. McGraw cautions that his conclusion is based on the less satisfactory evidence of studies in which the variables are manipulated interexperimentally rather than intraexperimentally. If statistical validity can be demonstrated for McGraw's four variables just cited, the learner and procedural variables (i.e. the nature of the tasks) appear to be equally as important as the variety of the tasks. More succinctly, in establishing generality for the phenomenon of effects of reward, the central research problem becomes one of determining what it is about these tasks that makes performance on them susceptible to a disruptive effect of reward.

Overjustification Hypothesis

Lepper initiated a pilot study (Lepper, Greene & Nisbett, 1973) to test what was termed the 'over-justification' hypothesis. This theoretical model suggested that the use of excessive extrinsic pressure to induce an individual to engage in an activity of initial interest in its own right, as a means to some extrinsic goal, might lead that individual to view his or her actions as extrinsically motivated and to find that activity uninteresting in the later absence of extrinsic pressures. The study was designed to make it possible to draw inferences about individuals' relative intrinsic interest—their interest in an activity for its own sake—from their choices among classroom options.

Three groups of children participated in the study as follows.

- (1) In the control condition, children were simply shown the experimental materials and asked if they would like to draw pictures with some of these materials. Since only children who had an initial interest in this activity were selected, all of them agreed to do so and engaged in the activity without expectation or receipt of any tangible reward for their efforts.
- (2) In the expected award condition, however, children were first shown a Good Player Award and asked if they would like to win such an award. After the children had expressed a desire to win the award, they were told that they could win this award for drawing pictures with the target materials and were asked explicitly to agree to draw pictures with the provided materials to win this award. At the completion of the experimen-

tal period, these children were given the award and the same verbal feedback as the children in the control condition.

(3) In an unexpected award condition, children were asked initially, as in the control condition, to engage in the activity without expectation of reward. After they had finished, however, these children were shown and given, unexpectedly, the same reward and feedback as children in the expected reward condition.

The main purpose of these procedures was to determine their effects on later intrinsic interest in the activity in the subsequent absence of any further expectation of reward or other extrinsic constraints. Several weeks later, postexperimental observations revealed that expected awards subjects played with the target activity significantly less, indeed half as much, as they had during earlier baseline periods, whereas the control and unexpected award groups showed no significant change from baseline interest levels.

These initial findings and studies with adult populations by other investigators have provided evidence of conceptually comparable effects across a wide variety of specific experimental tasks, particularly tangible rewards and contingent systems; and analogous effects have been obtained across an unusually wide range—from preschoolers through adults (Scott & Yalch, 1978). These further studies greatly extend the generality of Lepper's initial study and offer insights concerning the conditions under which detrimental effects of extrinsic rewards on subsequent intrinsic interest are likely to be observed.

Ulterior Motivation

In order to provide a conceptual background for the potential implications of these results, Lepper (1980) briefly summarized the major themes of the literature subsequent to his 1972 pilot study. The largest portion of this subsequent literature has focused on an attempt to specify the conditions under which extrinsic rewards may have adverse effects on later interest. These conditions involve variations in the nature or the manner of presentation of extrinsic incentives or constraints imposed upon task engagement or performance.

Apparently, two central parameters determine the effects of extrinsic contingencies on subsequent intrinsic interest: perceptions of external constraint and perceptions of personal competence. A recent study by Sansone (1986) found that competence information "can affect both perceived competence and personal valuation," and that feelings of competence are made a primary goal of a task. Lepper's initial analysis suggested that it is the *perceived instrumentality* of one's actions as a means to some extrinsic goal that leads one to view the activity subsequently as less inherently interesting. A number of studies have demonstrated that the provision of extrinsic rewards in a manner that emphasizes an *ulterior* usefulness of one's actions will produce decreases in later interest. Lepper & Green (1978) distinguish between product versus process answers. In one component of their research, learners who were paid to solve problems tackled them in a way that

was more 'answer oriented,' and an earlier incidence of guessing answers was noted. Locating the answer is satisfying when 'success' is the central goal, but 'solving the mystery' may be more important to cognitive development. Strategies of learning are different under an instrumental as opposed to an intrinsic motivational context. Lepper & Green conclude that their study of the step-by-step sequence of activities in problem solving suggests that the offer of a reward does not simply 'undermine' intrinsically motivated behavior; it results in an entirely different sequence of activity, with attention directed to different aspects of the informational array.

Conversely, when the same rewards are presented in a fashion that does *not* promote perceptions of one's engagement in the activity as instrumental, the resultant authentic task engagement does *not* lead to decreases in later interest. Detrimental effects are more likely to occur when instrumental motives have been emphasized over one's interest in the activity itself.

Effects of Subjects' Perceptions

The conclusions of a second and equally important body of research suggest a need to address the effects of extrinsic rewards on perceptions of competence as well as on perceptions of constraint. These findings derive from attempts to compare the effects of two sorts of contingent reward procedures:

- (1) 'task-contingent' rewards, presented to learners as contingent simply upon engagement in the activity without regard to the quality of one's performance, versus
- (2) 'performance-contingent' rewards, presented to learners as contingent upon specified levels of excellence in the activity.

In several studies that have directly compared tangible extrinsic rewards presented as contingent upon mere task engagement or superior task performance, performance-contingent rewards proved less likely than task-contingent rewards to have an adverse effect on later intrinsic interest. Other studies providing further support for this distinction with older children and adults have compared tangible task-contingent and social performance-contingent rewards. The task-contingent learners experienced a decreased interest over time; however, the social performance-contingent learners experienced increased interest. In situations in which extrinsic rewards may convey both task-contingent and performance-contingent information, the net effect of the procedure should depend on the relative strength of these two effects. It is notable that in all but one study which Lepper (1973, 1978, 1980) reviews, extrinsic rewards—even performance-contingent rewards which give evidence of superiority in performing a task—have not been shown to significantly increase later intrinsic interest in the activity. The practical effects of these findings can be briefly summarized as follows.

- (1) Provision of extrinsic rewards contingent upon task engagement may affect learners' *perceptions of continued instrumentality*. In other words, if one believes that tangible rewards may follow task engagement in the

future, the result should be increased task engagement in the future as long as the expectation of reward is in effect.

(2) Provision of extrinsic rewards contingent on the quality of one's performance on an activity may influence perceptions of one's personal competence in an activity. Under most circumstances, increases in perceived competence are predicted to increase subsequent interest in the activity for its own sake.

(3) Provision of contingent, and particularly unnecessary, extrinsic rewards may lead to perceptions of external constraint, as may other forms of social control. The consequence of these perceptions will be decreases in subsequent intrinsic interest. The effects of any particular reward system will depend upon the effects that the program has on each of these factors and the situation in which subsequent behavior is observed.

More recently, Sansone (1986) found that although competence information (in the form of feedback) could affect both perceived competence and personal valuation for learners, individual differences in achievement orientation could moderate the effect of both competence (and task feedback) or intrinsic motivation. She also found that although perceptions of self-determined competence were not automatically beneficial to intrinsic interest, positive competence feedback could enhance intrinsic interest by enhancing perceived competence.

Problems of Deriving Discrete Dimensions in Motivation Research

In a recent study, Greene (1985) suggests that our incomplete understanding of motivation stems in part from the fact that most motivational research is conducted within one of several independent or competing strands, each focused on different variables. He addressed this concern by investigating interrelationships among motivational variables drawn from locus of control theory and from attribution theory (self-concept of ability, expectancy of success, causal attribution), along with measures of school achievement. Specifically, the study investigated three problematic conceptual gaps in motivation research: the direction of causality in motivation-achievement relationships; the validity of theoretical predictions in field settings; and the degree of overlap among existing motivational constructs.

The most original contribution is in this latter area, which was addressed by investigating interrelationships among motivational variables drawn from the social learning theorists' study of locus of control (Lefcourt, 1976; Rotter, 1966, 1975) and from the cognitively oriented attribution theorists' work on causal perceptions (e.g. Weiner, 1974, 1979). Differences between these two theoretical perspectives include three important motivational issues: (a) the meaning of perceived control, (b) the distinction between ability and effort in academic motivation, and (c) the role of incentive value in motivational processes.

An analysis of relationships across theories provided some clarification of targeted conceptual issues. In the first issue, two distinct clusters of motivational variables evolved. The meaning of perceived control in both clusters is based on

perceived contingency between actions and outcomes. In the first cluster, contingency rests on perceived ability factors, and thus is not susceptible to personal volition. In the second cluster, contingency includes effort factors which highlight the instrumentality of behavior in attaining desired outcomes.

In the second conceptual issue, the separation of ability and effort factors into the two motivational clusters was supported both by attribution theory and by other theoretical orientations such as learned helplessness theory, self-perspectives on achievement motivation, and self-efficacy theory. The third conceptual issue is the importance given by locus of control theory to incentive value, which received some support in this study. Thus, the degree to which participants valued academic rewards was positively related to the frequency of their effort attributions and to their locus of control, but generally not to ability perceptions or attributions.

Replication Study of Performance-contingent Reward

One of the pivotal research studies reported in Lepper's (1980) review of research was Deci (1971, 1972), who found evidence that financial rewards which are made dependent on task performance can reduce the intrinsic motivation to do that task. A replication study (Pritchard, Campbell & Campbell, 1977) re-evaluates the hypothesis that performance-contingent extrinsic rewards will decrease intrinsic motivation.

The method of this study consisted of chess problems that were found to be intrinsically interesting to subjects with chess-playing experience. Two groups of subjects were tested, with two sessions for each group one week apart. The first (no-money) group was told that the experiment dealt with solving chess problems. Actually, the experiment focused on the behavior of the group during a ten-minute break following the initial problem-solving session. Sample chess problems with instructions for solving them were scattered around the break room, and the amount of time each subject had eye contact with a chess problem was observed through a two-way mirror and recorded. Following the break, the subjects were asked to solve as many chess problems as possible within a 30-minute period.

Procedures were similar in the second (money) group, except that subjects were told that the person who solved the largest number of chess problems in the thirty-minute performance session would receive \$5.00. They were also told that the money was only used in the first session, and that no money would be available for the second session.

Two dependent variables were of central interest in the results of this study. The first variable was the change in the amount of time spent working on problems in the free period from the first session to the second. This dependent variable was the basis for the principle analysis to test the hypothesis that extrinsic performance-contingent financial rewards decrease intrinsic motivation. The paid group showed a much larger decrease in the time spent in the free period from session 1 to session 2 than did the group that was not paid (see Fig. 1).

The results of this study offer strong support for the Deci hypothesis that contingent financial rewards can reduce intrinsic motivation. This is particularly

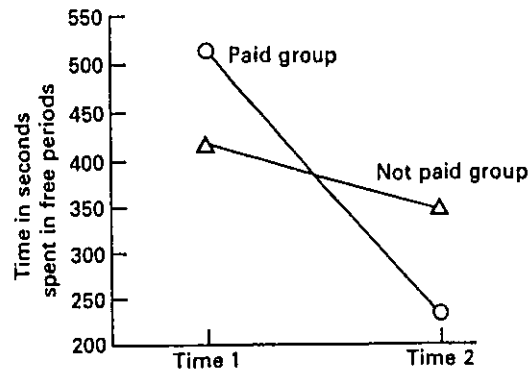


FIG. 1. Time spent on task in free period by condition and time period.

true since the methodological reservations about Deci's research design can be largely discounted in the research design just outlined (Pritchard, Campbell & Campbell, 1977).

Determinants of Intrinsic Motivation

These authors caution against a simplistic cause and effect conception of the effect of extrinsic reward upon intrinsic motivation. Similarly, Sharpley (1985) found that the concept of vicarious reinforcement in the general literature was both simplistic and inaccurate since, despite value accorded them, rewards do not necessarily increase the probability of the behavior desired. Pritchard, Campbell & Campbell (1977) argue that a number of variables influence intrinsic motivation, such as feelings of self-determination, feelings of competence, feedback, task variety, task challenge or difficulty, and others. Anything that influences these determinants of intrinsic motivation has an effect on intrinsic motivation, but only an indirect effect. While the extrinsic reward may decrease a *determinant* of intrinsic motivation, such as self-determination, it does not directly decrease intrinsic motivation. For example, suppose that extrinsic motivation were increased due to a contingent financial reward, but at the same time performance feedback were increased. In such a situation, feelings of self-determination might decrease due to extrinsic reward, but feelings of accomplishment might increase due to increased feedback. Thus, both extrinsic and intrinsic motivation could increase. This hypothetical example suggests that there is not a direct causal link between extrinsic reward and intrinsic motivation. In their examination of the effects of praise on motivation, Koestner, Zuckerman & Koestner (1987) suggest that the motivational impact of effort-focused praise depends in part on whether the praise occurs in task-involving (i.e. task-focused) or ego-involving conditions. Effort-focused praise under ego-involving conditions tended to have a negative impact, which suggested a helplessness-inducing effect.

Future research needs to focus on the determinants of intrinsic motivation rather than on global factors affecting motivation. Rogers (1985) has pointed out

the need to look more closely at the interaction of extrinsic rewards with initial levels of intrinsic motivation before indiscriminantly applying rewards strategy in classes without regard for individual differences among children. The global studies of motivation have lent themselves to a misinterpretation of causal factors and an overgeneralization of findings.

Intrinsic Motivation as an Organic Need

Susan Harter (1981) adds a new dimension to the studies of Deci (1975) and Lepper (1980) in an attempt to specify the conditions under which extrinsic rewards undermine intrinsic motivation. Whereas Deci and Lepper focused on mastery and competence in their hypothesis, Harter's approach takes White's (1959) model of motivation as a point of departure. White viewed the human organism as impelled to engage in mastery attempts, with an intrinsic need to deal effectively with the environment. Sansone (1986) has cited incongruity or uncertainty theories of intrinsic motivation which suggest that acquisition of knowledge about previously uncertain or ambiguous events is intrinsically rewarding.

Cognitive evaluation theory (Koestner, Zuckerman & Koestner, 1987) sees intrinsic motivation as stemming from the need to be self-determining and competent, and as rising or falling to the degree that those qualities are fostered. Harter's starting point addressed the following question: to what degree is a student's motivation for classroom learning determined by his or her intrinsic interest in learning and mastery, curiosity, and preference for challenge, in contrast to a more extrinsic orientation in which the student is motivated to obtain teacher approval for grades and is dependent on the teacher for guidance? Within this framework, Harter created a self-report scale with both an intrinsic and an extrinsic motivational pole:

- (1) learning motivated by curiosity versus learning in order to please the teacher;
- (2) incentive to work for one's own satisfaction versus working to please the teacher and get good grades;
- (3) preference for challenging work versus preference for easy work;
- (4) desire to work independently versus dependence on the teacher for help;
- (5) internal criteria for success or failure versus external criteria (e.g. grades, teacher feedback) to determine success or failure.

Table I reveals the format of a sample item which contains five levels of response relevant to intrinsic and extrinsic motivation.

TABLE I. Five levels of response relevant to intrinsic/extrinsic motivation

Really not true for me.	Somewhat not true for me.	Some students know when they have made mistakes without checking with the teacher.	Somewhat true for me.	Really true for me.
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This instrument proved to be a reliable and valid measure sensitive to individual differences in both intrinsic and extrinsic orientation. The results demonstrated the meaningful isolation of five measurable components. The data also strongly supported the argument that one should identify dimensions of a construct such as motivational orientation rather than consider it a global or unitary construct.

Of the five subscales assessed, there were two relatively independent clusters of sub-scales. After a closer examination of the subscale and item content, the challenge, curiosity, and mastery subscales each had a definite *motivational* flavor in that they tapped issues involving what the child wants to do, likes to do, and prefers. A student with a high score on these subscales is telling us that he or she is intrinsically motivated to engage in the mastery process.

In contrast, the judgement and criteria subscales seem to tap more cognitive-informational structures. High scores on these two subscales are telling us that a student has learned about the rules of the game called 'school' and the basis on which he or she makes decisions. Thus, only three of the subscales appear to be truly motivational in nature, whereas the remaining two are more informational.

In a later study, Harter (1983) examines the relationship between the motivational/informational correlates of the 1981 study with two additional correlates: perceived competence and perceptions of control. The findings indicate that these combined motivational subscales are highly predictive of a student's sense of competence in the classroom. Thus, classroom orientation clearly predicts perceived competence, actual competence, and perceived control (internal or external).

The potential uses of the scale include students for whom school learning problems are central, particularly in classroom interventions designed to influence a student's motivation. It also holds promise as a predictive instrument, i.e. a screening device to determine which type of educational curriculum may be more appropriate for a given student. For example, the scale may help to identify those students requiring more structure, who are more extrinsic in their orientation, in contrast to those who seem better able to meet the demands of a more 'open' curriculum. Thus, a more appropriate matching of teaching style and classroom management techniques with each student's learning style may now be possible, with the promise of better adjusted students and enhanced performance.

Effect of Extrinsic Rewards on Goals and Approach to an Activity

When an activity is undertaken explicitly in order to attain some extrinsic reward, those features of task engagement that learners perceive as most relevant to achieving a reward will define a set of goals that will guide learners' approach to and engagement in the activity (Condry & Chambers, 1978; Lepper & Green, 1978). The presence of such ulterior goals is likely to lead learners to respond by seeking the earliest and most direct way of achieving a reward, even if that means that the subject will actually experience less inherent interest in performing the task itself. This tendency is determined in terms of a 'minimax' principle: learners are motivated to maximize reward with a minimum of effort. A study by Condry & Chambers (1978) suggests that the offer of a reward which depends on the solution

of a complex task will lead learners to guess repeatedly at the solution without doing the work involved to examine the correctness of their guesses. Similar negative effects have been observed with extrinsic rewards imposed on task performance in activities that permit one to select particular problems to work on from a larger set containing problems of varying difficulty levels. Learners confronted with such a choice will typically show a preference for problems of moderate or intermediate difficulty. Adults (Condry & Chambers, 1978) will show marked shifts toward the choice of less difficult and challenging problems in conditions in which extrinsic rewards have been offered dependent upon correct problem solutions. Again, these shifts appear to occur at the expense of one's enjoyment of the activity for its own sake.

Effects of Extrinsic Rewards on Incidental Learning

Research in incidental learning has produced considerable evidence that reward can have a detrimental effect on performance (McGraw, 1978). Reward in these studies is offered for intentional task performance, and then incidental learning is measured as a function of whether or not a subject was rewarded during the intentional learning phase. Studies in this area differ as to whether the incidental events that subjects are not instructed to attend to are spatially separate or contiguous with the intentional stimuli that subjects are instructed to attend to. There is evidence of a detrimental effect of reward on both types of tasks.

Bahrck, Fitts & Rankin (1952) provided a clear illustration of the detrimental effect of reward on learning involving spatially separate events. Johnson & Thomson (1962) control for the problem of incidental learning in which subjects may self-instruct themselves to learn the incidental material. Their findings conclude that incidental learning is inferior when reward is offered for intentional performance.

An experiment with adults (Bahrck, 1954) demonstrates that reward can have a detrimental effect of the formation of incidental associations. Condry & Chambers (1978) illustrate more qualitative adverse effects of rewards on task performance. College students were presented with a complex concept-learning task under two conditions of contingent-reward or no-reward. Those subjects expecting a reward attempted to guess the answer earlier and more persistently, and they made less efficient use of their time on task.

Lepper (1980) reports that very little relevant research has been conducted on the effects of extrinsic rewards contingent on task performance over time. Certain tentative conclusions, however, can legitimately be considered. If the offer of extrinsic rewards leads learners to attempt problems they are certain they can already answer correctly, they might be expected to learn less, in the long run, than those who have attempted more challenging problems during this period. The Condry & Chambers (1978) study provides a clear example of subsequent performance deficit. An important finding of this study on the delayed effects of extrinsic rewards involved those subjects who were subsequently confronted with a similar activity but who were instructed not to guess or give an answer until they were sure it was correct. Those subjects who had previously undertaken the task in order to

obtain a reward were much more likely to say they had the right answer before they could logically have determined its correctness. It appears that the reward-contingent original performance had within it elements which disrupted later systematic, effective problem-solving processes. This effect, combined with the suppression of incidental learning even at the time of task performance, points to both immediate and long-term negative effects of inappropriate extrinsic rewards.

CONCLUSION

The inescapable conclusion to be reached from an extensive review of the reward research is the reality of the detrimental effect phenomenon. Vasta (1981) reports the phenomenon to be prevalent and robust, and it warrants the respect of the behavioral community. The evidence for a detrimental effect comes from a wide variety of tasks in which a large number of subject and methodological parameters have been varied (McGraw, 1978). McGraw concludes that "rewards' detrimental effects are potentially as widespread as its benefits". Condry & Chambers (1978) report that the use of rewards in the 'motivation' of learning is placed in doubt by their research evidence.

However, the undermining of intrinsic interest in a target behavior is not an inevitable result of typical token reward procedures (Vasta, 1981). It is critically important to avoid the oversimplification that token programs somehow possess an inherently inimical quality in and of themselves. Instead of focusing exclusively on the token reward system itself, a more productive focus would be on the conditions under which token reward systems undermine intrinsic interest. Condry & Chambers (1978) cite the need to focus on the 'informational context' rather than on reward per se. They see the most productive area of research as the individual's 'control' of the motivational process.

Condry & Chambers (1978) conclude that there is a good deal of research to be done before it is possible to develop a complete and accurate theory of the process of learning under different motivational contexts. Vasta (1981) feels that the absence of more definitive research findings does not warrant the dismissal of the undermining phenomenon as irrelevant, but instead suggests a need for continued discretion in the adoption and administration of token reward programs.

While an overview of the effects of reward systems offers no ultimate solution to the problem of motivation, knowledge of the potential 'hidden costs' of reward can help us avoid inappropriate use of rewards. At the same time, such knowledge gives us the insight to design future reward systems that avoid the harmful effects which current research indicates are a potential outcome of poorly-designed reward systems.

Implications for the Classroom

In his extensive review of the central themes of the research literature concerned with the potential detrimental effects of extrinsic rewards and constraints on task performance and subsequent intrinsic interest, Lepper (1980) very carefully quali-

fies the practical classroom application of these findings by stating that a prescriptive set of guidelines for the use of extrinsic rewards is not warranted by the present research. Instead, Lepper indicates further questions that we would need to be able to answer to know the actual significance of these findings for classroom practice. Lepper categorizes these questions into the following areas.

(1) *The Engineering Question.* In order to minimize attempts to short circuit a reward system by guessing, cheating, or other means, it may be possible to be sufficiently clever in designing the contingency system to take into account this possibility and to include such possible responses in the contingency system itself. For example, in the study which revealed that the subjects selected only easy problems to gain quick access to the reward, a relatively minor variation in the contingency system was found to eliminate or diminish this effect. Making the contingency more specific concerning the amount of work required to obtain the reward tended to minimize or reverse the 'minimax' effect—the least effort for the greatest reward.

(2) *The Ecological Relevance Question.* It is important to distinguish between what is known about the most effective ways in which rewards may be employed, based on current research, and what actually goes on in most classrooms. Lepper's keenest insight is that the very prevalence of token economies in today's classrooms stands as testimony to the difficulties teachers have in using conventional rewards at their disposal to achieve even immediate functional control over students' behavior. Since extrinsic rewards are used in lieu of very effective but underemployed conventional rewards, the unintended negative consequences of inappropriately used rewards strongly suggest a need to reform motivational techniques that affect intrinsic interest.

(3) *The Evaluation Question.* The question of how different contingency systems may be evaluated depends less on data than on the values and goals which are the underlying assumptions of any reward system. The best conditions for improving motivation depend on the knowledge the student possesses initially and the knowledge he or she is likely to acquire through additional engagement with the topic, the student's general feeling of personal competence and ability, and the student's feeling of self-determination versus external constraint. It is vitally important to distinguish between individual students for whom a given classroom approach may be necessary and sufficient to produce task engagement and learning, and those for whom it is unnecessary and potentially harmful to later interest in the activity itself. The neglected aspect of evaluating reward systems, beyond the immediate effects that a reward system may have on performance and intrinsic interest, is the effects they may have on students' failures.

Lepper's warning about the 'overjustification' effect is also cited by McGraw (1978) as a crucial motivational variable: The most easily avoidable motivational

situation, which research places high on the list of 'undermining' effects, is the use of superfluous reward in the presence of pre-existing intrinsic interest. A second critical motivational variable is the nature of the task. The types of tasks most susceptible to detrimental effects are described as 'heuristic' or discovery-oriented tasks in which the subjects do not know what to do in advance.

Of vital importance to the classroom is Lepper & Greene's (1978) distinction between product and process answers. Product answers promote the 'perceived instrumentality' of one's actions as a means to a goal, with a loss in later intrinsic interest. Conversely, focusing on a step-by-step approach to problem solving that emphasizes interest in the activity itself results in authentic task engagement that does not lead to decreases in later interest. For example, the most recent approach to teaching composition reconceptualizes writing as a process rather than as a product. It is the process itself that engenders self-discovery through self-expression in a way that analysis of a piece of writing as a static document can only partially accomplish. Sharpley (1985) found that conversation is also an important source of feedback in transmitting desired effects.

The issues that underlie differences in approach to achieving a constructive balance between external control and internal motivation of students, or in emphasizing primarily external control or self-control, are truly fundamental, as Bruner (1962) has noted:

The distinction between cognitive control and control by coercion and seduction is a deep one. The one operates by intrinsic 'self-administered rewards and punishments,' the other is regulated by gains and losses that are extrinsically administered. The role given to each of these forms of control . . . is the single most telling feature of any psychological theory about the nature of man—whether one envisions man as ultimately captive of the shaping forces of his environment or as competent to shape a world of his own. (p. 133)

The growing body of knowledge on motivational issues in human learning will enable informed teachers to be 'shaping forces' in creating an optimum learning environment for students. As veteran teachers have suspected all along, "he governs best who governs least". Cognitive control, the ability of one mind to influence and facilitate the development of other minds, is a more powerful source of influence than any form of coercion or persuasion. A teacher's primary responsibility remains the enhancement of students' intrinsic interest in learning—the facilitation of 'learning jags,' as Carl Rogers (1969) terms it. Extrinsic rewards do not appear to be inherently harmful to intrinsic interest, but a great deal more investigation must be done on the "motivational context" of reward situations before truly definitive guidelines can be drawn that will avoid or minimize potentially harmful effects of rewards.

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