Ed. by C. Ames & R. Ames
San Diego, CA: Academic Press, Inc.

3

Intrinsic Motivation in the Classroom

Mark R. Lepper
Melinda Hodell

The most important attitude that can be formed is that of desire to go on learning.

Dewey, 1938

INTRODUCTION

It is one of the persistent paradoxes of educational psychology that so many children seem to have motivational problems in our schools. As potential educational reformers have noted time and again (e.g., Holt, 1964, 1968; Jackson, 1968; Silberman, 1970), the young child, outside of school, seems blessed with a seemingly limitless curiosity, a thirst for knowledge, a will to learn. Young children begin to acquire a first language, and sometimes a second and third, with remarkable facility and minimal confusion; and they do so at the tender age of two and in the relative absence of formal instruction. They learn a great deal about the social and physical environments in which they live and how to navigate through those complex environments, with limited overt tuition. Some even learn significant amounts about the process of reading or the rudiments of arithmetic without being explicitly taught these subjects. Rarely, if ever, does one find a parent complaining about his or her preschooler's lack of motivation for learning.

RESEARCH ON MOTIVATION IN EDUCATION
VOLUME 3: GOALS AND COGNITIONS

Observe these same children a few years later, however, as they sit in elementary-school classrooms, and one sees a different picture. For many of these children, motivation is now a problem. Attention strays; minds wander. Extrinsic incentives and sanctions are now required to motivate children to learn their assigned lessons.[1] In this, as in many other ways, schools seem to have changed little in the last half century (Cuban, 1982; Sirotnik, 1983). Walk into most elementary-school classrooms, and take a look around. Most likely, you will see students' stories and art works stapled on the bulletin boards, bearing red-inked evaluations such as "excellent" or "good job." Likely there will be a chart of book reports or science projects, with Marjorie or Roberto obviously out in front with many more stars, or X's, or colored-in squares. On the blackboard might be a chalked list of class monitors, lunch-money collectors, and children who have to stay in at recess to do spelling. You may see attendance records posted conspicuously, along with 100% math papers and exemplary student artwork.

What has happened to these formerly excited, curious, intrinsically motivated children? They have met, and have been enveloped by, a system that necessarily constrains and standardizes their learning opportunities. The content of what they are taught is governed by a general curriculum that defines in advance not only what, but also when, particular subjects will be taught to students at each grade level. The result, as Bruner (1962, 1966) and many others have pointed out, is a *decontextualization* of the knowledge children are asked to acquire in school (Condry, 1978; Ginsberg, 1977). Information is presented in an abstract form, dissociated from the contexts in which it might be of obvious, everyday use to children. Topics are presented when the schedule calls for them, not when particular children are especially interested or "ready" to learn about them.

Likewise, the methods by which children learn in school are limited by a variety of constraints inherent in our system of separate classrooms in which individual teachers have sole and simultaneous responsibility for 30 students or more. Much of school, as Jackson (1968) and others have so eloquently illustrated, revolves around a hidden curriculum of social control and classroom management. Children spend many hours in crowded classrooms, waiting, in transition, and in passive observation of the teacher's interactions with other students (Dreeben, 1968; Winnett & Winkler, 1972).

[1] As is explicated later in this chapter, it is likely that the overuse of extrinsic incentives may be one *cause* of decreases in intrinsic motivation among more advanced students. Once intrinsic motivation declines for any reason, however, extrinsic incentives do become increasingly necessary if students are to be kept on task.

As a result, motivation can become a problem for many students in our educational system. Indeed, though it is a difficult claim to evaluate, there is some evidence to suggest that such effects may be cumulative through the years. Harter (1981), for example, has found that as students move from third through ninth grade in our school system, they report activity preferences that show them to be less and less intrinsically motivated, but instead, more and more extrinsically motivated. The older the students, the more likely they are to indicate, for instance, that they would prefer a simple but boring task that would clearly please the teacher to a more challenging and interesting task that is not on the teacher's immediate agenda.[2]

What might the significance of such effects be? Since the mid-1970s, there has been something of a revival of interest in the study of intrinsic motivation and its determinants (e.g., Csikszentmihalyi, 1975; Deci, 1975, 1981; Deci & Ryan, 1985; Harter, 1978, 1981; Lepper, 1981, 1983a; Lepper & Greene, 1978b; Lepper & Malone, 1987; Malone, 1981; Malone & Lepper, 1987; Ryan, Connell, & Deci, 1985). In the present chapter, we examine this literature with respect to two basic questions.

First: What difference does it make? Should we really be concerned if, in school, intrinsic motivations are gradually supplanted by extrinsic motivations? In this case, we focus on a literature that has examined the ways in which the use (or, more accurately, the misuse) of overly powerful extrinsic rewards and sanctions may unwittingly undermine children's intrinsic motivation. In particular, we consider research regarding the *consequences* of decreases in students' intrinsic motivation in classrooms.

Second: What might be done? What methods might schools use to maintain or enhance children's intrinsic motivation—to make classroom learning more interesting or enjoyable? In this case, we examine a more recent line of investigation that has involved the study of techniques of instructional design, of methods for altering the structure of educational activities so as to enhance students' intrinsic motivation. Here, we focus especially on what difference it might make if one were successful in making learning activities more intrinsically motivating for children. Are there actually important differences in the ways children learn from activities, for instance, as a function of their level of intrinsic motivation?

[2] It would be of considerable interest to know whether these changes actually involve an increase in students' extrinsic motivation, a decrease in their intrinsic motivation, or both. Unfortunately, the existing data do not permit one to differentiate among these possibilities.

UNDERMINING CHILDREN'S INTRINSIC MOTIVATION

The recent revival of interest in the experimental study of intrinsic motivation has its immediate origins in a set of studies initially undertaken independently by three different groups of investigators, all concerned with the possibility that the inappropriate use of tangible rewards and sanctions might have detrimental effects on children's intrinsic interest (Deci, 1971; Kruglanski, Friedman, & Zeevi, 1971; Lepper, Greene, & Nisbett, 1973). Though involving very different activities, rewards, and subject populations, each of these initial investigations seemed to provide convergent evidence concerning some potential "hidden costs" of a reliance on extrinsic rewards and punishments to motivate and control children's behavior (Lepper & Greene, 1978b). Consider, first, the literature derived from these early investigations.

DETERMINANTS OF UNDERMINING EFFECTS

The parallel demonstrations of detrimental effects of the use of functionally superfluous extrinsic rewards in three geographically disparate laboratories, then, provided the initial impetus toward a concern with intrinsic motivation. In the first of these, Deci (1971) compared the subsequent responses of college subjects who had been offered money to work with a geometric puzzle of high initial intrinsic interest with those who had played with the same puzzle without pay. In a subsequent session involving no extrinsic rewards, he found that previously rewarded subjects chose to spend less time playing with the puzzle than did previously nonrewarded subjects.

By contrast, Kruglanski, Friedman, and Zeevi (1971) offered half of a sample of Israeli high-school subjects a personal tour of nearby university facilities in exchange for their engagement in a series of experimental tasks. Compared to other subjects who had undertaken these same activities without the promise of any extrinsic reward, rewarded subjects reported more negative attitudes toward the experimental tasks. These authors also report a number of other adverse effects of reward on various indices of task performance that we consider in more detail later in this chapter.

In a third study, Lepper, Greene, and Nisbett (1973) worked with preschool children selected on the basis of their initial high intrinsic interest in a particular art activity in their regular classrooms. These

subjects were then asked to engage in this same art activity in a different setting, under one of three conditions. Some were offered the chance to win an attractive tangible award for engaging in this activity; others were offered no such award, although half of these other children did receive the same award unexpectedly. Three weeks later, in their normal classrooms where awards were no longer present, children who had previously agreed to engage in the target activity in order to receive an award showed significantly decreased interest, compared both to their own baseline levels of interest and to the levels of postexperimental interest shown by children who had received no award or an unexpected award.

These comparable results of the three studies, obtained across such a wide array of tasks, incentives, and subjects, suggested the potential generality of detrimental effects of extrinsic rewards on intrinsic motivation. At the same time, these results also seemed to fly in the face of traditional wisdom, and to contradict the results of a variety of behavioral treatment programs that had demonstrated the potential beneficial effects of appropriate uses of tangible extrinsic rewards and punishments (Lepper & Greene, 1978a). As a result, a considerable literature has developed concerning the conditions under which such salient extrinsic constraints or incentives are likely to decrease, or to increase, students' subsequent intrinsic motivation.

As recent reviews of this literature suggest (e.g., Deci, 1981; Deci & Ryan, 1985; Lepper, 1981, 1983a, 1983b; Quattrone, 1985; Ryan, Connell, & Deci, 1985), some controversy continues concerning the specific processes by which extrinsic rewards may have detrimental effects on intrinsic motivation. The basic outlines of the phenomenon, however, seem fairly clear. Such effects are most likely to occur, for example, when initial interest is high, when extrinsic constraints are superfluous and salient, and when they provide a psychologically plausible explanation for one's engagement in the activity—when the reward, in short, can be easily viewed as a "bribe." Unnecessarily powerful extrinsic rewards, functionally superfluous temporal deadlines, and excessive adult surveillance all can be shown to have negative effects on children's later intrinsic interest in the activity for which those constraints were imposed (Lepper, 1981). Indeed, the mere creation of an instrumental, contingent, means–end relationship, even between two activities of high and initially equivalent interest to the child, may be sufficient to create a decrease in the child's later intrinsic interest in the activity undertaken as a means to some ulterior end (Lepper, Sagotsky, Dafoe, & Greene, 1982).

Such adverse effects are less likely to occur, by contrast, when extrinsic

rewards are seen as "bonuses," rather than "bribes." When tangible rewards are based on task performance, for example, and convey to children clear positive information about their high competence and ability at an activity, the rewards will generally be less likely to undermine later intrinsic interest than when they are offered simply for task engagement (Lepper, 1983a). Similarly, rewards that have some integral or endogenous relationship to the activity for which they have been provided will be less likely to undermine interest than those that bear a more arbitrary or exogenous relationship to the task undertaken (Kruglanski, 1978).

The conditions under which the use of inappropriately powerful extrinsic rewards may undermine intrinsic interest have been discussed at length in a number of other sources (e.g., Deci & Ryan, 1985; Lepper, 1981, 1983a). One final point concerning this first literature bears emphasis, however. Very few of the experiments in which subjects are initially intrinsically motivated have yet found any reliable method for using extrinsic rewards to increase intrinsic motivation further, whereas a number of investigations have found that such rewards may be important in enhancing interest among subjects who do not find the activity of initial intrinsic interest (Bandura & Schunk, 1981; Calder & Staw, 1975; Loveland & Olley, 1979; McLoyd, 1979).

CONSEQUENCES OF UNDERMINING INTRINSIC INTEREST

What happens, then, when a student's intrinsic interest is undermined through the use of superfluous extrinsic rewards or the application of other unnecessarily powerful techniques of social control? Although the central focus of this research literature has historically been the finding that children subsequently choose the activity less when tangible rewards are no longer available, a number of authors have studied and reported other conceptually related effects as well. Some of these effects concern aspects of performance or learning that occur immediately (i.e., in the setting in which a superfluous tangible reward has been offered for task performance or engagement). Others involve effects that may appear days or weeks later, when the same activity, or one similar to it, is subsequently encountered.

Immediate Effects

Consider the ways in which the presence of an unnecessarily powerful extrinsic incentive or sanction may have immediate effects on the child's response to the activity undertaken in order to obtain that incentive or

avoid that sanction. Given that the incentive is indeed superfluous (i.e., not needed to induce the child to engage in the activity), two general sorts of negative consequences have been observed. Some involve detrimental effects on *peripheral* or *incidental performance* measures—aspects of task performance that are irrelevant to the attainment of the extrinsic reward. Others involve deleterious effects on *central performance* measures—aspects of task performance on which the receipt of extrinsic reward is clearly contingent.

Effects on Peripheral Performance Measures. One of the most common, and certainly the most thoroughly studied, potential adverse consequence of offering extrinsic rewards for task performance is a decrease in performance on aspects that are *peripheral* to reward attainment—for example, dimensions of performance on which students do not expect to be graded or evaluated. To the extent that extrinsic constraints may serve as a powerful incentive for the individual, their availability will provide a stimulus to the individual to concentrate his or her energy, effort, and attention on those aspects of the task perceived as instrumentally relevant. As a result, less energy and attention is likely to be devoted to parameters of performance on which extrinsic rewards are known not to be contingent.

Such an idea, of course, considerably predates the recent literature on intrinsic motivation, as McGraw (1978) ably documents. For example, evidence illustrating that the offer of tangible rewards may undermine performance on incidental learning tasks has been around for many years (e.g., Bahrick, 1954; Bahrick, Fitts, & Rankin, 1952). Even so, recent studies have highlighted some of the potentially less obvious implications of such a mechanism.

Garbarino (1975), for example, found the presence of extrinsic incentives to produce a variety of negative, peripheral social effects in a peer-tutoring situation. In particular, Garbarino compared the performance of sixth-grade children either offered or not offered a tangible reward contingent on their success in tutoring a first-grade pupil on a novel activity. Receipt of the reward in this situation was, thus, not contingent on the use of any particular tutoring style or technique. Nonetheless, tutors who expected a reward for their efforts if successful made more demands of the tutee, provided more criticism, and generally created a social context characterized by a more negative emotional tone.

In a similar vein, Harter (1978) examined the effects of the offer of a reward, contingent only on the number of problems children solved correctly, on children's choices of which problems to attempt. In a setting in which children were permitted to choose a set of problems

from a number of levels of expected difficulty, Harter found that the presence of such extrinsic rewards led children to select easier problems than they would have in the absence of rewards. Because the solution of more difficult problems did not, in this setting, yield larger extrinsic rewards, the difficulty of the problems was incidental to receipt of reward; yet the offer of rewards led children to opt for simpler problems for which success was more certain—even though, as Harter also showed, those children found these easier problems less intrinsically interesting. Extrinsic incentives, in a sense, drove out intrinsic incentives.

Finally, when the criteria determining the receipt of a salient extrinsic reward are not clearly specified, it can also be shown that students will tend to take the apparent path of least effort. In studies by Greene and Lepper (1974) and Lepper et al. (1973), for instance, young children who were asked simply to draw pictures in order to obtain a proffered reward tended to work more quickly and to produce pictures of lower rated average quality than their peers who had undertaken the same activity without expectation of any tangible reward. Since receipt of a reward was not explicitly tied to the quality of their artwork, children working for a reward put less time and effort into their drawings.

Effects on Central Performance Measures. The aforementioned effects are, of course, easily understood from a number of theoretical perspectives (Lepper & Greene, 1978c). Somewhat more surprising and more difficult to explain, however, are findings of detrimental effects of superfluous extrinsic rewards on measures of central task performance, because here a focusing of attention and effort on instrumentally relevant parameters might be expected to enhance, rather than to undermine, performance. The literature reveals a surprising number of cases, however, in which this second, more subtle type of detrimental effect also occurs.

One class of activities for which such effects seem particularly common is the category of tasks that require creativity or insight for their solution. If extrinsic rewards or external evaluation standards, for instance, are imposed on students working on tasks where creativity of response is the central criterion of performance, the consequences are typically negative. In the earliest demonstrations of such effects, Glucksberg (1962, 1964) found that subjects offered a reward for solving two classic *functional fixedness* problems (in which creative, nonstandard uses of everyday materials are required for success) took significantly longer to reach acceptable solutions than subjects offered no such reward. Kruglanski et al. (1971) demonstrated similar effects of rewards on the performance of Israeli high-school students asked to

suggest novel titles for a set of stories or to compose an original story from a selected list of words. In both cases, students offered an extrinsic reward were rated as showing less creativity than those not offered any tangible reward.

Similarly, McGraw and McCullers (1979) observed differences in the ability of college students to reach an insightful solution to a Luchins water-jar problem. Here again, students not expecting a reward performed more effectively. After the complex solution that had led to success on previous trials had suddenly failed, these students found it easier to "break set" and to uncover the simple solution that would now solve the problem. Most recently, Amabile's investigations of the determinants of artistic creativity have found that the offer of unnecessary extrinsic rewards (Amabile, Hennessey, & Grossman, 1986) and the imposition of salient evaluative pressures (Amabile, 1979) both undermined the rated creativity of students' efforts.

Other tasks in which central performance indices seem to show impairment in the face of superfluous extrinsic pressures are those described by McGraw (1978) as requiring insightful or heuristic, rather than formal and algorithmic, solutions. Several investigators, for example, have studied the effects of proffered extrinsic rewards on performance on complex concept- or discrimination-learning problems, which proved (for their respective subject populations) too complex to permit algorithmic solutions (cf. McGraw, 1978). Moreover, demonstrations of such effects have once again been available for a considerable time (e.g., Miller & Estes, 1961; Terrell, Durkin, & Wiesley, 1959).

In addition to differences in eventual learning outcomes, more recent investigations have been able to show detrimental effects of superfluous extrinsic incentives offered for task performance on a variety of trial-by-trial measures of learning efficiency. Thus, Condry and Chambers (1978) found that rewarded subjects working on a concept-attainment task made a higher proportion of illogical and redundant requests for information, as well as more incorrect guesses, than did nonrewarded students. Similarly, in Garbarino's (1975) study of tutoring, those tutors offered a reward were not only incidentally more critical and demanding of their pupils, but they also proved significantly less effective in the central task of actually teaching the material to their younger charges.

Such effects, of course, are considerably more interesting than those that reflect a simple redirection of attention toward instrumental goals. Here, one needs to postulate some additional mechanism—an involuntary narrowing of the range of cues and dimensions to which a person can simultaneously attend (Easterbrook, 1959) or a strengthening of existing prepotent responses by increases in drive level (Spence, 1956),

as a function of the presence of an extrinsic incentive—to explain the results that have been reported. The implications of these results for classroom practices, however, are potentially considerable.

Subsequent Effects

Such immediate performance effects, naturally, carry no necessary implications for students' responses to the activities involved, once the student is outside the specific setting in which rewards have been offered or sanctions threatened. Potentially more significant, and socially pernicious, would be effects that persist or generalize to later encounters with these activities outside the context in which extrinsic constraints had been encountered.

Subsequent Choice of Activities. One such effect is evident and provided a focus of interest for some of the earliest studies in this area—that students will be less likely to choose to engage in previously (and superfluously) rewarded or constrained activities in later settings in which salient rewards or constraints are no longer present. What might deserve emphasis, however, is the apparent strength of these effects. In studies with preschool children, for example, not only were significant differences in children's willingness to choose the experimental activity observed 3 weeks after the conclusion of experimental sessions, but these differences occurred in a different setting from that in which subjects had had previous experience with the same activity (e.g., Greene & Lepper, 1974; Lepper & Greene, 1975; Lepper et al., 1973).

Subsequent Task Performance. Other research suggests that the prior use of superfluous extrinsic rewards or sanctions may also have other sorts of persistent effects. As mentioned earlier, Condry and Chambers (1978) compared the strategies of subjects offered and subjects not offered tangible rewards for success on a complex concept-attainment task and found clear evidence that the offer of rewards led students to pursue less logically efficient strategies for information seeking and hypothesis testing. More importantly, these investigators also observed these subjects several weeks later, when they were again confronted with a complex concept-attainment task. This second time, however, Condry and Chambers made quite explicit an important change in the ground rules for engaging in this task. In this second session, students were to wait before venturing an answer until they were absolutely certain that they had solved the problem and had completely eliminated all possible

alternative hypotheses. Strikingly, even in this second setting in which the rules for successful performance at the task had been changed, students continued to show adverse effects of the prior reward manipulation. Once again, rewarded subjects made a higher proportion of illogical guesses, made more redundant moves, and proceeded in a less systematic fashion. In addition, they offered answers to the problem, about which they claimed to be positive, before they could logically have eliminated alternative possibilities.

Such persistent changes in the ways in which activities are later approached or undertaken, although of enormous potential importance, have, unfortunately, been only rarely studied. One other relevant demonstration of this sort derives from work by Pittman, Emery, and Boggiano (1982), who examined the effects of prior receipt of tangible rewards for task engagement on students' later choices among different versions of an activity that varied in complexity or difficulty. In the initial session of this study, the offer of a tangible reward produced a significant shift in children's choices toward the selection of generally easier and less complex problems, as in the aforementioned Harter (1978) study. More importantly, when these same children were later afforded a chance to engage in the activity at different levels of difficulty, they continued to show a preference for less difficult problems and less complex versions of the activity.

THE MULTIPLE FUNCTIONS OF REWARDS AND SANCTIONS

From this research tradition, then, it is clear that the misuse of extrinsic incentives and sanctions can have a variety of detrimental effects on children's intrinsic motivation, task performance, and learning. Even within this same experimental literature, however, it is equally clear that the use of extrinsic rewards and punishments does not always, or necessarily, produce negative consequences. Indeed, under appropriate conditions in this work, extrinsic rewards have been shown to enhance motivation and to promote learning (e.g., Condry, 1977; Lepper & Greene, 1978a; McGraw, 1978). What is needed, obviously, is an analysis that would serve to specify the circumstances under which extrinsic rewards are likely to have detrimental, versus beneficial, effects on students.

One potentially useful perspective for considering such questions involves an analysis of the several conceptually distinct functions that extrinsic rewards may serve (cf. Lepper & Gilovich, 1981). As illustrated

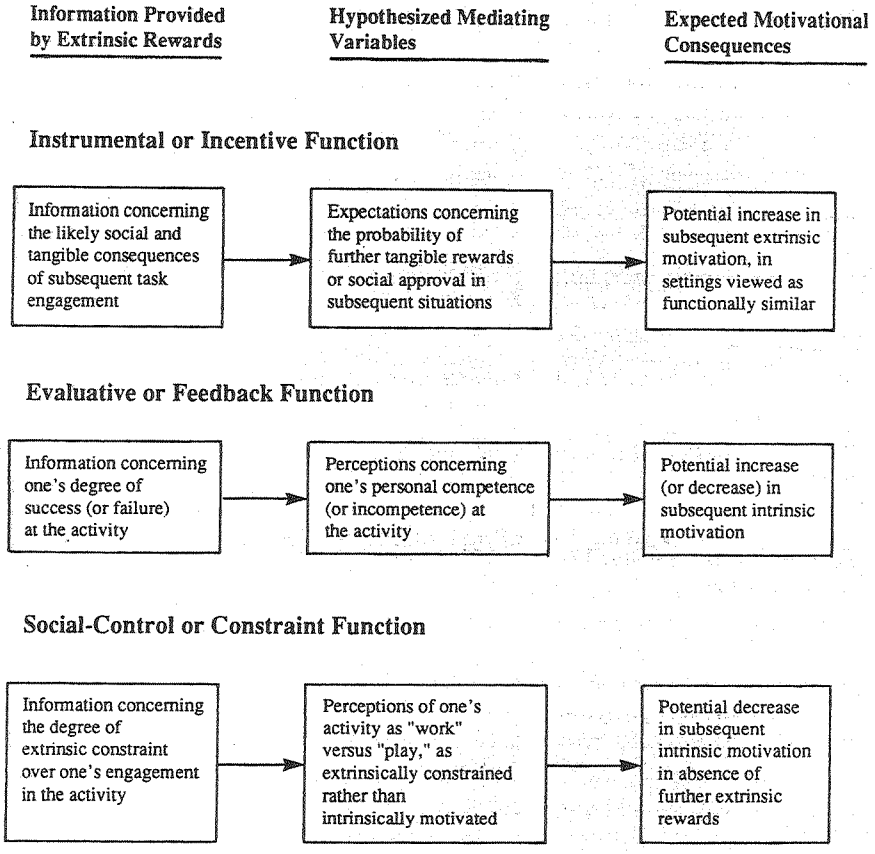

Figure 1. The multiple functions of extrinsic rewards.

in Figure 1, the available literature suggests at least three quite different sources of information that extrinsic rewards may provide to children in school. Each of these sources of information, in turn, may exert an independent influence on children's later motivation in subsequent settings. Hence, the net influence of the introduction of any given reward procedure on children's later behavior may depend on each of these three separate, and potentially conflicting, factors.

Instrumentality

First, and most obviously, extrinsic rewards may serve an instrumental or incentive function. That is, whether perceived as "bribes" or "bonuses," rewards may contain information that the rewarded activity is one that may lead to additional extrinsic rewards in the future. Activities that have led to the receipt of tangible rewards in the past may produce similar consequences in the future—at least in situations that the child sees as functionally related to the setting in which rewards were initially received. This is, of course, the fundamental assumption of classical social-learning theory accounts of reinforcement processes (e.g., Bandura, 1969, 1977; Lepper & Greene, 1978a; Mahoney, 1974; Mischel, 1973).

Thus, a first process by which the introduction of extrinsic rewards may affect subsequent motivation involves the effects of those rewards on children's expectations regarding the continued instrumentality of the previously rewarded activity. The power of such processes is amply attested by the extensive literature documenting the effectiveness of token-economy programs as a means of increasing appropriate, and decreasing disruptive, classroom behaviors—as long as children expect that they will continue to receive tangible rewards for their actions (e.g., Kazdin, 1977; O'Leary & Drabman, 1971). In the case of this first variable, note that there is no assumption that children's *intrinsic* motivation has been affected by the provision of rewards, but simply that children may choose to engage in activities even though they find them intrinsically aversive if the extrinsic payoff is sufficiently large.

Furthermore, especially in institutions such as schools, the provision of tangible rewards for certain types of activities will typically convey to children a more general message concerning the sorts of activities that are differentially valued by their parents and teachers. As a result, children may come to believe that engagement in highly valued activities is likely to produce social recognition and approval even if no further tangible rewards are available. That the teacher has awarded students points and privileges for taking turns, raising their hands, or sitting quietly while others speak, for example, may indicate to children that these are behaviors of which he or she particularly approves (Winnett & Winkler, 1972). Under such circumstances, children may choose to continue to engage in the activity in order to obtain further social approval—though, once again, only in those similar situations in which such further social rewards might reasonably be expected and only in those circumstances in which children sufficiently value the approval of the teacher. The typical lack of transfer of effects from classroom token-economy programs, despite the obvious social messages they convey, for instance, may suggest that the children who are the targets of such programs place little value on earning the approval of their teachers (Lepper & Greene, 1978a; O'Leary & Drabman, 1971).

Evaluation

A second function that extrinsic rewards may serve is the provision of evaluation or feedback regarding one's performance. Thus, extrinsic rewards may provide children with important information concerning their success, and more generally their competence, at particular activities. In some cases, extrinsic rewards may simply signal success at the task; in others, they may provide considerably more specific information about the quality of one's performance, relative either to social norms or to measures of one's own past performance on the same, or closely related, tasks. Grades, gold stars, honor rolls, and the like are generally intended to serve such an evaluation or feedback function in schools.

This feedback function, through which extrinsic rewards may influence children's subsequent motivation, focuses on the ways in which extrinsic rewards may influence children's perceptions of their competence at the activity and their expectations concerning the likelihood that they may succeed or fail at that activity in the future. Historically, such concerns have played a central role in analyses of children's achievement motivation and achievement-related behaviors (e.g., Atkinson, 1964; McClelland, 1961; McClelland, Atkinson, Clark, & Lowell, 1953). More recently, they have proved a focus of attribution theorists concerned with the analysis of achievement-related behaviors and children's understandings of the causes of their successes and failures (e.g., Dweck, 1986; Dweck & Elliott, 1983; Weiner, 1974, 1979, 1985).

Through this evaluation process, reward procedures that lead to increases in children's perceptions of their own competence and self-efficacy at the rewarded activity are expected to increase children's subsequent intrinsic motivation toward the previously rewarded activity in the future, whether or not additional extrinsic rewards are expected (e.g., Bandura & Schunk, 1981; Deci, 1975; Deci & Ryan, 1981; Harackiewicz, Manderlink, & Sansone, in press; Harter, 1978; Lepper & Greene, 1978c; Schunk, 1984, 1985; Weiner, 1979). Conversely, extrinsic incentive systems that serve to lower students' perceptions of competence and self-efficacy (as may be the case for some students with grades or other comparative evaluation systems) may decrease the subsequent intrinsic motivational appeal of the activity.

Social Control

Finally, rewards may also serve a social-control or constraint function, as illustrated in the literature concerning the potential deleterious effects of the use of functionally superfluous extrinsic rewards (Condry, 1977; Deci, 1975; Deci & Ryan, 1985; Lepper, 1981, 1983b; Lepper & Greene, 1978c; Quattrone, 1985; Ryan et al., 1985). In this third case, the relevant conceptual variable involves children's perceptions of their reasons for engaging in particular activities (e.g., Lepper et al., 1982). Here, the central issue is whether the introduction of extrinsic rewards leads children to view their engagement in the activity as extrinsically constrained and instrumentally controlled rather than intrinsically motivated. If so, their subsequent intrinsic interest in the activity, in terms of this third process, will be reduced.

Such decreases in later intrinsic motivation, of course, will necessarily run counter to any increases in extrinsic motivation that may be produced by reward systems that lead children to believe that further engagement in a previously rewarded activity will continue to produce further tangible rewards. Such decreases may also stand in opposition to any positive effects the reward system may have had on students' perceptions of their own competence at the activity. Thus, predicting the effects of a given reward procedure on children's later motivation may require attention to each of these three conceptually independent processes. In traditional "overjustification" studies, it should be noted, both the evaluation and the instrumentality functions are typically held constant; rewards are used in ways that do not convey to children salient information about their competence at the activity, and their responses are observed only in subsequent settings in which there is no longer any expectation that further engagement in the activity will lead to additional extrinsic rewards. Under these controlled conditions, children previously rewarded for engaging in activities of high initial interest will show consistent decreases in interest in those activities, as illustrated in the research discussed in the preceding sections of this chapter.

IMPLICATIONS FOR THE CLASSROOM

The direct application of this analysis to classroom practice, of course, is necessarily complex (e.g., Lepper, 1983a). The foregoing literature clearly establishes the potential difficulties that may result when one attempts to overcome a lack of intrinsic interest in learning through the use of extrinsic rewards and sanctions. Any particular reward procedure, any specific extrinsic incentive, may simultaneously produce multiple effects on subsequent motivation through the existence of potentially opposing processes; therefore, predicting its precise effects on children's behavior in some later setting will require attention to each of these individual component processes and to their conjoint effects on children's subsequent motivation.

One straightforward implication of the preceding literature, for example, might be that programs in which extrinsic rewards are contingent simply on the child's conformity to rules (such as those involved in many token economies) ought only to be used when their use is necessary to get children to comply with those rules. If children were initially willing to comply with the same rules without the offer of extrinsic rewards, that is, the use of superfluous extrinsic incentives would be likely to undermine children's motivation to comply in subsequent settings in the later absence of further rewards. The difficult question here, however, would be how to know precisely when, and what type of, rewards are actually necessary to produce particular behaviors.

Moreover, there are other potential consequences of the imposition of an effective reward system, even in cases where the rewards are absolutely necessary. If children who had been offered rewards simply for sitting quietly in their seats, for instance, now spend more time working on their homework, they may be acquiring new skills or knowledge that will lead them to feel more competent in the subject. Such increases in perceived competence may produce increases in intrinsic motivation that more than offset any decreases in motivation created by an increased sense of constraint. In addition, for many academic tasks, it may not be possible to experience the intrinsic satisfactions of activity until one has acquired a minimal level of proficiency. If extrinsic rewards can be used to start children reading or playing an instrument, those children may begin to experience new sources of motivation from the activity itself. Once this is so, however, one might then wish to withdraw extrinsic incentives, gradually, so as not to undermine these newly found sources of intrinsic interest. Indeed, the process of effectively withdrawing extrinsic rewards and sanctions when they are no longer necessary represents perhaps the single topic most in need of systematic further study (Deci & Ryan, 1985; Lepper, 1981; 1983b).[3]

Finally, the effects of any given reward program on later interest should be likely to vary as a function of individual differences among the students to whom rewards have been offered. What may be a necessary incentive or bribe to students who do not find a particular activity of high initial interest may also prove a wholly superfluous and unnecessarily powerful constraint for other students who already find that activity of inherent interest (Lepper & Gilovich, 1981; Lepper & Greene, 1978c). Similarly, receipt of a "B" on the semester exam may prove an

[3] A more detailed discussion of the potential trade-offs between different competing functions of extrinsic reward systems in schools is beyond the scope of the present chapter. More extended discussions of a number of these issues, however, can be found in previous papers (Lepper, 1983a, 1983b; Lepper & Gilovich, 1981).

enormously powerful boost to students who arrive in class with histories of failure and low levels of self-esteem, whereas receipt of the same grade to the budding, highly confident valedictorian may seem a personal tragedy. Detrimental effects of extrinsic rewards seem especially likely, therefore, in cases in which a single set of constraints (designed, typically, to motivate the least attentive student in the class) is applied to an entire classroom of students of varying abilities and initial interests.

ENHANCING CHILDREN'S INTRINSIC MOTIVATION

In contrast to the preceding literature, which focused, for a variety of historical reasons, on the study of variables that undermine intrinsic interest, a few more recent analyses have tried to examine the opposite side of this coin—to investigate techniques for enhancing children's intrinsic motivation toward particular activities. These more recent approaches, in addition, have turned from the study of social and contextual variables (such as the offer of extrinsic rewards or the imposition of temporal deadlines) to the study of how activities themselves might be structured and designed so as to be more intrinsically motivating to children. These later studies have also begun to focus more clearly on activities of obvious educational value.

FORMS OF MOTIVATIONAL EMBELLISHMENT

The starting point for this more recent work involved an attempt by Malone (1980, 1981) to propose a conceptual framework for thinking about features of activities that might determine their intrinsic interest to children. Malone's goal, in part, was to create a useful taxonomy of sources of intrinsic motivation that could contribute to making an activity more intrinsically interesting. As revised and elaborated by Malone and Lepper (1987), this taxonomy suggested that there are four primary sources of intrinsic motivation that an activity might provide an individual. A brief sketch of their analysis is presented in Figure 2.

Challenge

Perhaps the most obvious and ubiquitous source of intrinsic motivation that activities may offer to students is the provision of an effective challenge to their skills. To provide the student an appropriate level of

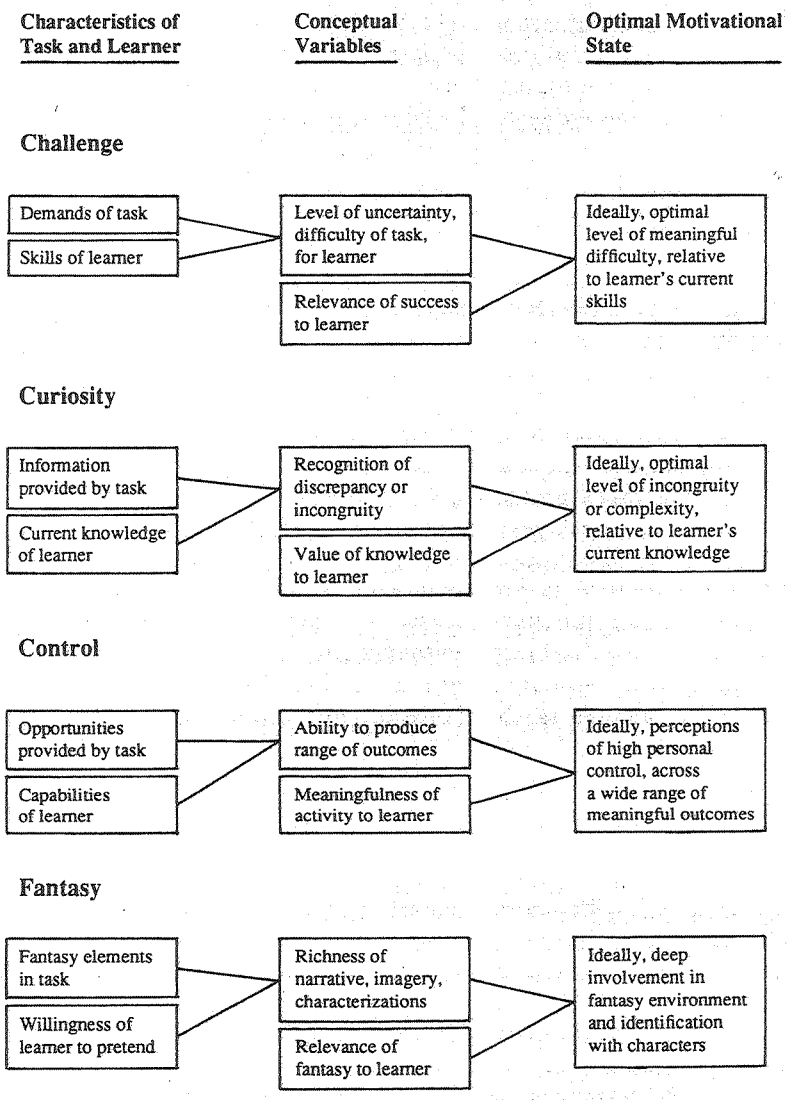

Figure 2. Sources of intrinsic motivation.

challenge, a number of theorists have suggested, an activity must present a clear and meaningful goal, or set of goals, whose attainment is uncertain. Optimally challenging activities, therefore, will be those at an intermediate level of difficulty for the student—activities that are neither trivially simple nor impossibly hard. Moreover, in order to remain challenging over time, an activity must be able to vary in its

demands on the learner as he or she acquires increased information about, and/or skill at, the task.

Essentially similar ideas have been discussed by previous authors in a variety of contexts. White (1959, 1960), Harter (1978, 1981), and others, for example, have postulated a basic and innate drive toward mastery that has been labeled an "effectance" motive. Kagan's (1972) focus on uncertainty as a motivational force takes a conceptually related position, as do a number of discussions of perceptions of competence (Deci, 1975; Lepper & Greene, 1978c; Weiner, 1980) or self-efficacy (Bandura, 1977; Bandura & Schunk, 1981) as critical determinants of intrinsic motivation. In each case, activities that present a moderate level of difficulty to the student are assumed to be preferred. Similarly, conceptual analyses by Csikszentmihalyi (1975, present volume) have focused on the ways in which activities capable of continuously adjusting the level of challenge they provide, as a function of the progress of the learner, may produce a state of "flow" that is characteristic of behaviors that are highly intrinsically motivating.

In addition, though less widely discussed, the goals toward which activities must be directed must have some meaning for students in order for them to find the challenge of reaching that goal intrinsically motivating (Malone & Lepper, 1987). For instance, for a challenge to be intrinsically motivating, it must engage the learner's sense of self-esteem. The activity must draw on some skill or knowledge of the student, and the student must value that specific skill or knowledge. Under the right conditions, even the most boring activity could be made more challenging by imposing constraints on one's engagement in the activity. Some constraints may prove legitimate and meaningful to individuals or social groups (e.g., standing at a specified distance from the target at an archery context); whereas others may normally be seen as meaningless (e.g., standing on only one foot at the archery contest). Increases in the challenge provided by an activity should have positive effects on the intrinsic motivational appeal of the activity only when constraints are perceived as meaningful.

Curiosity

A second, crucial source of intrinsic motivation that activities may offer involves an appeal to the learner's sense of curiosity. Curiosity will be elicited, a number of authors have argued, by activities that provide students with information or ideas that are surprising, incongruous, or discrepant from their existing beliefs and ideas. Thus, information that suggests to students that their ideas are incomplete, inconsistent, or

even unparsimonious should be effective in provoking their curiosity (Malone, 1981). Incongruities instigate information-seeking, disconfirmed expectancies call for explanations, and inconsistencies cry out for resolutions. As was the case with challenge, however, intermediate levels of incongruity or discrepancy are hypothesized to be optimal. Ideas too greatly at variance with existing information and beliefs will tend to be discounted or rejected; ideas too similar to existing knowledge may be assimilated or ignored.

Once again, similar ideas have been discussed by a variety of previous authors. Berlyne (1960, 1965), for instance, focused on the idea of an optimal level of informational complexity and arousal as the major determinant of an individual's level of curiosity and examined at length the factors that contribute to informational complexity. Hunt (1961, 1965), drawing on ideas from Piaget (1951, 1952), provided a conceptually analogous model of curiosity in his discussion of optimal levels of discrepancy or incongruity (relative to current knowledge and expectations) as the wellspring of information-seeking and conceptual change.

Control

A third potential source of intrinsic motivation involves providing the student with a sense of control. From this perspective, empowering, and hence intrinsically motivating, learning environments will be those in which the student's outcomes may vary greatly and as a direct function of his or her own responses. Activities and environments that undermine a learner's sense of control, by contrast, will have detrimental effects on subsequent motivation and interest.

DeCharms (1968), for example, has posited that people have a basic drive to seek out and exert control over their environments—to experience themselves as "Origins," rather than "Pawns." Deci (1975, 1981), likewise, has sought to define intrinsic motivation in terms of a fundamental human drive toward self-determination. As a result, increasing even just the "illusion of control" (Langer, 1975) that activities provide might help to stimulate pupils' intrinsic motivation. Conversely, experiences that decrease perceptions of control can be shown, as in the literature on learned helplessness (e.g., Dweck, 1975; Seligman, 1975), to decrease later intrinsic interest in the activity.

Fantasy

Finally, activities may promote intrinsic motivation through the creation of learning environments that encourage the learner to become

involved in a world of fantasy and make-believe. Such fantasy environments can evoke mental images of physical or social situations not actually present and may contribute to intrinsic motivation in several ways. First, the use of fantasy learning environments may serve a variety of motivational or emotional needs. In fantasy, students can experience vicariously, through a process of identification with fictitious characters, a variety of rewards and satisfactions that may not be available to them in real life. In this sense, the use of fantasy may frequently provide one source of meaning for students engaged in otherwise personally irrelevant activities. Also, the introduction of fantasy elements into an activity may help to enhance students' motivation by providing concrete and familiar settings to which the substance of the activity is relevant and to which the material can be related.

The early, psychodynamic literature on fantasy focused heavily on the various emotional needs that fantasy might serve (e.g., Freud, 1950; Murray, 1938). Here, fantasy was taken as a vehicle through which we might identify with characters who achieve levels of fame, fortune, or power that elude us in our daily lives. In contrast, early Piagetian work on fantasy (Piaget, 1951) focused instead on the cognitive structuring and elaboration that fantasy elements added to otherwise more mundane and literal tasks. More recent discussions concerning the antecedents and consequences of fantasy (Fein, 1981; Singer, 1973) have tried to take into account both sorts of processes.

EFFECTS OF MOTIVATIONAL EMBELLISHMENTS

Once one has identified the various sources of intrinsic motivation that may be produced by an activity, one may consider the design principles implied by these factors. In so doing, of course, one is immediately drawn to the question of how one might enhance the motivational appeal of initially uninteresting educational activities through the addition of motivational embellishments of different sorts (Malone, 1980, 1981). Malone and Lepper (1987), for example, present a conceptual analysis of these issues.

Many of the activities children are asked to undertake in school, for example, involve a fairly repetitive and often boring drill-and-practice or study-and-test format. For example, students who have just been taught about the Pythagorean theorem will often be asked in the following days to solve a variety of problems whose solutions involve the use of that theorem in various forms. Given that a certain right triangle has one side of length x and a hypotenuse of length y, what is the length of the other side?

How might such an activity be made more intrinsically interesting? Presumably, one might attempt to enhance the interest value of such an activity by increasing any of the aforementioned sources of intrinsic motivation. If the task appeared too simple for the learner, for example, one might seek to increase the degree of challenge offered by the activity by introducing additional performance contingencies (e.g., a time limit for working on each problem), by adding an element of competition between individuals or groups within the classroom, or by providing inherently more difficult problems.[4]

Alternatively, one might seek to provoke a sense of curiosity on the part of the student, by demonstrating that his or her current knowledge is inaccurate, incomplete, or inelegant. One might describe to the learner, for instance, two children who are trying to figure out the hypotenuse of a right triangle with sides of 90 and 120 feet. As one child begins to apply the relevant formula, taking out a pencil and figuring out 90^2 and 120^2, the other says immediately, "Oh, it's got to be 150." We might ask the learner, "How did this second child get the answer without any calculations?"

Level of student control over the activity might also be varied. Students might be offered choices concerning the time at which, or the order in which, they would attempt various problems. They might be given the option of going ahead to more difficult problems or continuing at the same level of difficulty. Or they might be given the option, at relevant points, of continuing on their own or of requesting assistance.

One particularly interesting case arises, however, when one considers forms of motivational enhancement or embellishment that might be undertaken without any alteration in the fundamental activity itself—cases in which one might be able to examine the effects of motivational embellishments that are independent of instructional content. Here, we might pose the question of the educational consequences of intrinsic motivation in an interesting fashion. If the intrinsic motivational appeal of an educational activity can be increased without concomitant changes in the instructional content of the activity, one may then ask whether children learn any differently when the activity from which they are learning is more fun.

Imagine that one has presented children with a lesson concerning the Pythagorean theorem and now wishes to ask those children to make use of this information in solving relevant problems. Typically, one might

[4] Conversely, if the task were initially too difficult for the student, one might seek to provide additional assistance, offer the student hints, or create additional, less-demanding performance goals that would provide a more appropriate level of challenge for that student.

simply present children with a series of problems in which they are asked, in the abstract, to determine the length of one side of a right triangle, given knowledge of the lengths of the other two sides—a quite straightforward activity. Suppose, however, that one were able to embed these same problems requiring the use of the Pythagorean theorem in some larger fantasy context that might be of more inherent interest to the student. For example, the student might need to calculate the distance from point *a* to point *b* in order to be able to advise Captain James T. Kirk on how to set the transporter beam on the Federation Starship *Enterprise* in order to pick up the necessary dilithium crystals directly below on the planet's surface, given that Kirk knows only the distances of the ship and the crystals from a third point where his scouting party is stopped.

With this particular sort of motivational embellishment, it becomes especially interesting to ask what the consequences of increasing the motivational appeal of the activity might be—controlling for the instructions, problems, and feedback that students receive and the time that they are allowed to spend with the activity. Do students exposed to these two types of activities show differences in their learning from the activity or their interest in it—both in the initial setting in which the embellishments are provided and in subsequent situations in which they are not (Lepper, 1985)? Such comparisons are of particular theoretical interest both because they speak to classic controversies concerning the role of intrinsic motivation in education and because they simultaneously address current heated policy debates concerning the appropriate role or motivational embellishments in education (Baker, Herman, & Yeh, 1981; Lepper & Chabay, 1985; Lepper & Malone, 1987).

Immediate Effects

Consider, first, the immediate effects (both on motivation and on learning) of such motivational embellishments in terms of students' reactions to otherwise identical educational activities presented with or without such adornments.

Effects on Motivation. The first question about such techniques is obvious: Do these sorts of instructionally incidental embellishments actually enhance students' interest in the activity itself? Somewhat surprisingly, there is little empirical evidence available to answer this question.

Some evidence that these sorts of enhancement procedures can

increase students' interest in the activity, however, has been obtained by Lepper and Hodell (1988). This study compared the effects of two parallel versions of a computer-based activity designed to give children experience with, and feedback concerning, the use of Cartesian coordinates. In the basal version, the activity presented children with a series of tasks that involved the use of a coordinate system to pinpoint a randomly chosen target point on the grid; in the embellished version, the same set of problems and exercises was embedded in a fantasy context in which the learner was asked to help a graphics character find a series of hidden treasures. Across several sessions, children were offered a continuous choice between their version of the experimental activity and a common distractor activity. On the average, children working with the embellished version of the activity chose to spend about 50% more time with it than children working with the unembellished version chose to spend with that activity. Other findings by Malone (1981; see also Lepper & Malone, 1987) also suggest that the addition of relatively minor motivational embellishments can have large effects on student interest.

Effects on Learning. Given that children do seem to find such activities more intrinsically motivating, a second obvious question arises: Do children working with a motivationally enhanced version of an activity learn any more, or any differently, than children working with an unadorned version of that activity? Will motivational embellishments distract children from the educational content of the activity and waste their time on irrelevant frills? Or will motivational adornments of this sort increase children's attention to, and learning of, the underlying content embodied in the program?

Again, recent research suggests that these sorts of embellishments can have positive effects on learning as well—even when the time spent at the activity is controlled, so that differences in learning are not simply the result of children spending more time with activities they find more highly motivating. In three separate studies, involving different basic activities and different fantasy overlays, enhanced learning of the material presented by students exposed to motivationally embellished educational programs has been observed. Unexpectedly, in the first of these studies, this enhancement-of-learning effect occurred only for boys (Lepper & Hodell, 1988). In both of the subsequent studies, however, such effects were equally apparent for both boys and girls (Hodell & Lepper, 1988; Parker & Lepper, 1988), suggesting that this finding is more robust than it had initially appeared.

Subsequent Effects

In addition to these immediate effects on motivation and learning, one may also ask what sorts of long-term effects such motivational embellishments may have on later interest in, or retention of, the material in subsequent situations.

Effects on Motivation. Consider the later motivational consequences of such activities. The important question here is not whether students continue to find the motivationally enhanced activity itself more interesting. Rather, it is whether children come to enjoy more, or less, the material presented via one form of the activity or another. Does the addition of game-like or fantasy elements to an activity designed to present mathematics, for example, lead children to be more or less attentive, or interested, or excited, when they encounter similar mathematical problems or topics elsewhere? Will one find a generalization of positive affect and interest, such that the subject matter becomes more enjoyable, even in the later absence of motivational enhancements? Or, will one find a contrast effect, such that the activity seems even less intrinsically motivating to students, once the added motivational features of the enhanced activity have been withdrawn?

To date, the evidence provides some support for a positive generalization of motivational benefits from the use of motivational embellishments. Hodell and Lepper (1988), in particular, found that students who had worked with a motivationally embellished computer program designed to teach children about Cartesian coordinates subsequently reported more positive attitudes towards graphing and related tasks—in the library, several days later, apart from any computer-based activities—than their peers who had worked with an unembellished version of the same program initially. In other studies, similar but statistically nonsignificant effects were obtained. In no case has there been evidence to support a contrast analysis.

Effects on Learning. Finally, one might also ask about subsequent learning or retention of the material initially learned at the activity. On these measures, the results also suggest a carryover of benefits of motivational-enhancement strategies. For example, in each of the studies demonstrating an effect of motivational adornments on learning, differences between conditions were apparent on paper-and-pencil achievement tests administered 1–2 weeks following the experimental sessions (Hodell & Lepper, 1988; Lepper & Hodell, 1988; Parker &

Lepper, 1988). In one of these studies, there was also evidence of differences in learning that extended beyond the specific tasks explicitly called for by the activity; students also performed better on more difficult generalization tests that built on the skills in which pupils had been instructed (Lepper & Hodell, 1988).

IMPLICATIONS FOR THE CLASSROOM

Taken together, these findings suggest the potential utility of motivational-enrichment strategies in the design of educational activities as one means of combating the problem of declining intrinsic motivation in school (Lepper, 1985; Lepper & Malone, 1987). Not only do such embellishments appear to make the activity itself more interesting and enjoyable for students; they also appear capable, under appropriate circumstances, of enhancing student learning and retention and promoting more positive subsequent attitudes toward the subject matter being presented.

In contemplating the implications of these more recent results for classroom practice, however, two additional considerations should be kept in mind. On the one hand, it seems likely that the foregoing experimental studies actually underestimate the potential benefits of such motivational-enhancement techniques because these studies have all involved an attempt to control for the time that children worked with the experimental activities. In many classroom contexts, however, children may have more freedom to determine the amount of time they spend with different activities. In these circumstances, more powerful and pervasive effects on learning and motivation might be expected if students exposed to motivationally enriched educational materials were to choose to spend more time with the experimental activities than those exposed to their unembellished counterparts.

On the other hand, it is also important that such procedures not be viewed as a motivational panacea. Although such techniques can be shown in the laboratory to produce significant benefits, it seems equally clear that not all motivational embellishments will produce these same positive outcomes. Lepper and Malone (1987), for example, describe a number of educational computer programs that are available in many classrooms today, in which motivational enhancements appear to have negative, rather than positive, effects on children's learning. Indeed, they suggest that it is distressingly easy to design educational programs that may prove highly motivating, but instructionally useless.

One critical distinction between those cases in which added motivational embellishments enhance, and those in which they undermine, student learning involves the extent to which the motivational goals of an educational activity either reinforce, or compete with, the instructional goals of that activity (Lepper & Malone, 1987).[5] In some instructional computer simulations, for example, students are allowed to accumulate winnings (hypothetical dollars or points earned) across an endless series of problems; and in these activities, children will often enter relatively mindless answers, trial after trial, as fast as they can type them in, because this provides a quicker means of accumulating earnings than a more thoughtful consideration of each answer. If these same activities simply limited students to 20 problems at a time, however, then the child could effectively accumulate big scores only by mindful attention to each answer. In the first instance, the goals of winning the game and learning the material appear to compete with each other; in the second instance, motivational goals appear congruent with instructional goals.

Finally, it seems likely that the effects of many types of motivational enrichments may depend on characteristics of the student as well. Clearly, different students may value different sorts of accomplishments (e.g., Malone & Lepper, 1987). Equally clearly, different students are likely to find different fantasy goals or contexts appealing (e.g., Singer, 1973). Hence, it may be important to find methods for matching particular students to particular activities or for offering students choices along these dimensions. Even the general strategy of motivational embellishment itself may have differential appeal to individual students. Perhaps such motivational variables, for example, may have the most effect on precisely those students who are least intrinsically motivated, at first, by the material itself.

CONCLUSIONS

In this chapter we have tried to address two complementary questions concerning the determinants and the consequences of intrinsic motivation in the classroom. In the first instance, we examined the potential significance of children's apparent loss of intrinsic motivation in school as they grow older, in terms of the literature that documents some of the ways in which we may unintentionally undermine intrinsic interest

[5] A fuller, more principled discussion of the circumstances in which the addition of motivational embellishments to an educational program is likely either to enhance or to decrease student learning and retention is presented in Lepper and Malone (1987).

through the misapplication of extrinsic rewards and sanctions. In the second, we explored the possibilities for overcoming such effects, in terms of the literature concerned with methods of designing more intrinsically motivating educational activities. Let us consider these two questions in turn.

First: Should we be concerned if children become increasingly extrinsically motivated and decreasingly intrinsically motivated as they progress through school? We think that the answer is yes, for several reasons. On the one hand, of course, one might value intrinsic motivation for its own sake. Helping children to enjoy the activities they undertake in school might be an end in itself.

In addition to its potential inherent value, however, the research literature on the ways in which intrinsic motivation is often undermined suggests that there are a variety of negative consequences that follow when extrinsic motivation supplants intrinsic motivation. On the one hand, extrinsically motivated students will be less likely to approach or choose similar activities in subsequent situations unless they expect further extrinsic rewards or sanctions to be forthcoming. Thus, they will be less likely to continue to pursue the subjects taught outside of the context of specific classroom assignments. On the other hand, the presence of salient extrinsic incentives also seems to have a variety of detrimental effects on learning and performance, both within the situation in which those incentives were offered and in later situations as well.

Second: Can such effects be overcome? We believe that the answer is "yes" once again. Here, the more recent research literature that we have discussed, concerning techniques for designing more intrinsically motivating educational activities, is relevant. It suggests that relatively small motivational embellishments can, under appropriate circumstances, have significant positive effects not only on students' enjoyment of the activity so embellished, but also on students' learning from the activity, their retention of the material learned, and their subsequent attitudes toward the subject matter being presented.

With the usual wisdom of hindsight, such conclusions may seem obvious. Therefore, it is important to be clear that both sets of statements deal with issues that have been highly controversial. In the arena of extrinsic rewards and intrinsic motivation, for example, there has been vociferous debate concerning the possibility that the use of tangible rewards might prove counterproductive (cf. Lepper, 1983a; Lepper & Greene, 1978b). Why shouldn't two rewards prove better than one, promoting enhanced motivation in subsequent settings?

Similarly, discussions concerning the relative merits and drawbacks of the use of motivational embellishments have produced vehement disagreement among educators (cf. Condry & Keith, 1983: Lepper, 1985; Lepper & Chabay, 1985). Proponents of such devices are often met with claims that such techniques distract students and undermine learning. Such techniques are likewise frequently criticized as likely to produce students who will be dependent on these motivational devices and who find the subject matter less inherently interesting in the absence of these gimmicks.

In an earlier era, Sydney Smith, the noted English cleric and essayist, voiced his strong opinion concerning the relationship between students' interests and learning: "Everything which is written is meant either to please or to instruct. The second object is difficult to effect, without attending to the first." If we take seriously the evidence presented in this chapter, we might say the same for most things that go on in schools.

ACKNOWLEDGMENT

Preparation of this chapter was supported, in part, by Research Grant HD-17371 from the National Institute of Child Health and Human Development to the senior author.

REFERENCES

Amabile, T. M. (1979). Effects of external evaluation on artistic creativity. *Journal of Personality and Social Psychology, 37,* 221–233.

Amabile, T. M., Hennessey, B. A., & Grossman, B. S. (1986). Social influences on creativity: The effects of contracted-for reward. *Journal of Personality and Social Psychology, 50,* 14–23.

Atkinson, J. W. (1964). *An introduction to motivation.* Princeton, NJ: Van Nostrand.

Bahrick, H. P. (1954). Incidental learning under two incentive conditions. *Journal of Experimental Psychology, 47,* 170–172.

Bahrick, H. P., Fitts, P. M., & Rankin, R. E. (1952). Effects of incentive upon reactions to peripheral stimuli. *Journal of Experimental Psychology, 44,* 400–406.

Baker, E. L., Herman, J. L., & Yeh, J. P. (1981). Fun and games: Their contribution to basic skills instruction in elementary school. *American Educational Research Journal, 18,* 83–92.

Bandura, A. (1969). *Principles of behavior modification.* New York: Holt, Rinehart and Winston.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 41,* 191–215.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-instruction. *Journal of Personality and Social Psychology, 41,* 586–598.

Berlyne, D. E. (1960). *Conflict, arousal, and curiosity.* New York: McGraw-Hill.
Berlyne, D. E. (1965). *Structure and direction in thinking.* New York: McGraw-Hill.
Bruner, J. S. (1962). *On knowing: Essays for the left hand.* Cambridge, MA: Harvard University Press.
Bruner, J. S. (1966). *Toward a theory of instruction.* Cambridge, MA: Harvard University Press.
Calder, B. J., & Staw, B. M. (1975). Self-perception of intrinsic and extrinsic motivation. *Journal of Personality and Social Psychology, 31,* 599–605.
Condry, J. (1977). Enemies of exploration: Self-initiated versus other-initiated learning. *Journal of Personality and Social Psychology, 35,* 459–475.
Condry, J. (1978). The role of incentives in socialization. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward* (pp. 179–192). Hillsdale, NJ: Erlbaum.
Condry, J., & Chambers, J. (1978). Intrinsic motivation and the process of learning. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward* (pp. 61–84). Hillsdale, NJ: Erlbaum.
Condry, J., & Keith, D. (1983). Educational and recreational uses of computer technology. *Youth and Society, 15,* 87–112.
Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety.* San Francisco: Jossey-Bass.
Cuban, L. (1982). Persistent instruction: The high school classroom, 1900–1980. *Phi Delta Kappan,* 113–118.
DeCharms, R. (1968). *Personal causation.* New York: Academic Press.
Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology, 18,* 105–155.
Deci, E. L. (1975). *Intrinsic motivation.* New York: Plenum.
Deci, E. L., & Ryan, R. M. (1981). *The psychology of self-determination.* Lexington, MA: Heath.
Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum.
Dewey, J. (1963). *Experience and education.* New York: Collier Books. (Original work published 1938).
Dweck, C. S. (1975). The role of expectations and attributions in the alleviation of learned helplessness. *Journal of Personality and Social Psychology, 31,* 674–685.
Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41,* 1040–1048.
Dweck, C. S., & Elliott, E. S. (1983). Achievement motivation. In P. H. Mussen (Gen. Ed.) & E. M. Hetherington (Vol. Ed.), *Handbook of child psychology: Vol. IV. Social and personality development* (pp. 643–691) New York: Wiley.
Easterbrook, J. A. (1959). The effect of emotion on cue utilization and organization of behavior. *Psychological Review, 66,* 183–201.
Fein, G. G. (1981). Pretend play in childhood: An integrative review. *Child Development, 52,* 1095–1118.
Freud, S. (1950). *Beyond the pleasure principle.* New York: Liveright. (Original work published 1920).
Garbarino, J. (1975). The impact of anticipated rewards on cross-age tutoring. *Journal of Personality and Social Psychology, 32,* 421–428.
Ginsberg, H. (1977). *Children's arithmetic: The learning process.* New York: Van Nostrand.
Glucksberg, S. (1962). The influence of strength of drive on functional fixedness and perceptual recognition. *Journal of Experimental Psychology, 63,* 36–41.
Glucksberg, S. (1964). Problem solving: Response competition and the influence of drive. *Psychological Reports, 15,* 939–942.

Greene, D., & Lepper, M. R. (1974). Effects of extrinsic rewards on children's subsequent intrinsic interest. *Child Development, 45,* 1141–1145.
Harackiewicz, J. M., Manderlink, G., & Sansone, C. (in press). Competence processes and achievement motivation: Implications for intrinsic motivation. In A. K. Boggiano & T. S. Pittman (Eds.), *Achievement and motivation: A social-developmental perspective.* Cambridge, England: Cambridge University Press.
Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental model. *Human Development, 1,* 34–64.
Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivational and informational components. *Developmental Psychology, 17,* 300–312.
Hodell, M., & Lepper, M. R. (1988). *The role of fantasy in student motivation and learning.* Unpublished manuscript, Stanford University.
Holt, J. (1964). *How children fail.* New York: Holt, Rinehart and Winston.
Holt, J. (1968). *How children learn.* New York: Dial.
Hunt, J. Mc.V. (1961). *Intelligence and experience.* New York: Ronald Press.
Hunt, J. McV. (1965). Intrinsic motivation and its role in psychological development. In D. Levine (Ed.), *Nebraska symposium on motivation* (Vol. 13, pp. 189–282). Lincoln, NE: University of Nebraska Press.
Jackson, P. W. (1968). *Life in classrooms.* New York: Holt, Rinehart and Winston.
Kagan, J. (1972). Motives and development. *Journal of Personality and Social Psychology, 22,* 51–66.
Kazdin, A. E. (1977). *The token economy.* New York: Plenum.
Kruglanski, A. W. (1978). Endogenous attribution and intrinsic motivation. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward* (pp. 85–108). Hillsdale, NJ: Erlbaum.
Kruglanski, A. W., Friedman, I., & Zeevi, G. (1971). The effects of extrinsic incentives on some qualitative aspects of task performance. *Journal of Personality, 39,* 606–617.
Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology, 32,* 311–328.
Lepper, M. R. (1981). Intrinsic and extrinsic motivation in children: Detrimental effects of superfluous social controls. In W. A. Collins (Ed.), *Minnesota symposium on child psychology* (Vol. 14, pp. 155–214). Hillsdale, NJ: Erlbaum.
Lepper, M. R. (1983a). Extrinsic reward and intrinsic motivation: Implications for the classroom. In J. M. Levine & M. C. Wang (Eds.), *Teacher and student perceptions: Implications for learning* (pp. 281–317). Hillsdale, NJ: Erlbaum.
Lepper, M. R. (1983b). Social control processes and the internalization of social values: An attributional perspective. In E. T. Higgins, D. N. Ruble, & W. W. Hartup (Eds.), *Developmental social cognition: A sociocultural perspective* (pp. 294–330). New York: Cambridge University Press.
Lepper, M. R. (1985). Microcomputers in education: Motivational and social issues. *American Psychologist, 40,* 1–18.
Lepper, M. R., & Chabay, R. W. (1985). Intrinsic motivation and instruction: Conflicting views on the role of motivational processes in computer-based education. *Educational Psychologist, 20,* 217–230.
Lepper, M. R., & Gilovich, T. (1981). The multiple functions of reward: A social-developmental perspective. In S. S. Brehm, S. M. Kassin, & F. X. Gibbons (Eds.), *Developmental social psychology* (pp. 5–31). New York: Oxford University Press.
Lepper, M. R., & Greene, D. (1975). Turning play into work: Effects of adult surveillance

and extrinsic rewards on children's intrinsic motivation. *Journal of Personality and Social Psychology, 31,* 479–486.

Lepper, M. R., & Greene, D. (1978a). Divergent approaches to the study of rewards. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward* (pp. 217–244). Hillsdale, NJ: Erlbaum.

Lepper, M. R., & Greene, D. (Eds.). (1978b). *The hidden costs of reward.* Hillsdale, NJ: Erlbaum.

Lepper, M. R., & Greene, D. (1978c). Overjustification research and beyond: Toward a means–ends analysis of intrinsic and extrinsic motivation. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward* (pp. 109–148). Hillsdale, NJ: Erlbaum.

Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic rewards: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology, 28,* 129–137.

Lepper, M. R., & Hodell, M. (1988). *When learning is fun: Instructional consequences of enhancing students' intrinsic motivation.* Unpublished manuscript, Stanford University.

Lepper, M. R., & Malone, T. W. (1987). Intrinsic motivation and instructional effectiveness in computer-based education. In R. E. Snow & M. J. Farr (Eds.), *Aptitude, learning, and instruction: Vol. III. Conative and affective process analyses.* Hillsdale, NJ: Erlbaum.

Lepper, M. R., Sagotsky, G., Dafoe, J., & Greene, D. (1982). Consequences of superfluous social constraints: Effects of nominal contingencies on children's subsequent intrinsic interest. *Journal of Personality and Social Psychology, 42,* 51–64.

Loveland, K. K., & Olley, J. G. (1979). The effect of external reward on interest and quality of task performance in children of high and low intrinsic motivation. *Child Development, 50,* 1207–1210.

Mahoney, M. J. (1974). *Cognition and behavior modification.* Cambridge, MA: Ballinger Publishing Company.

Malone, T. W. (1980). *What makes things fun to learn: A study of intrinsically motivating computer games.* Unpublished doctoral dissertation, Stanford University.

Malone, T. W. (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Science, 4,* 333–369.

Malone, T. W., & Lepper, M. R. (1987). Making learning fun: A taxonomy of intrinsic motivations for learning. In R. E. Snow & M. J. Farr (Eds.), *Aptitude, learning, and instruction: Vol. III. Conative and affective process analyses.* Hillsdale, NJ: Erlbaum.

McClelland, D. C. (1961). *The achieving society.* Princeton, NJ: Van Nostrand.

McClelland, D. C., Atkinson, J. W., Clark, R. W., & Lowell, E. L. (1953). *The achievement motive.* New York: Appleton-Century-Crofts.

McGraw, K. O. (1978). The detrimental effects of reward on performance: A literature review and a prediction model. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward* (pp. 33–60). Hillsdale, NJ: Erlbaum.

McGraw, K. O., & McCullers, J. C. (1979). Evidence of a detrimental effect of extrinsic incentives on breaking a mental set. *Journal of Experimental Social Psychology, 15,* 285–294.

McLoyd, V. C. (1979). The effects of extrinsic rewards of differential value on high and low intrinsic interest. *Child Development, 50,* 1010–1019.

Miller, L. B., & Estes, B. W. (1961). Monetary reward and motivation in discrimination learning. *Journal of Experimental Psychology, 61,* 501–504.

Mischel, W. (1973). Towards a cognitive social learning reconceptualization of personality. *Psychological Review, 80,* 252–283.

Murray, H. A. (1938). *Explorations in personality.* New York: Oxford.

O'Leary, K. D., & Drabman, R. (1971). Token reinforcement programs in the classroom: A review. *Psychological Bulletin, 75,* 379–398.

Parker, L., & Lepper, M. R. (1988). *Intrinsic motivation and learning: Beneficial effects of fantasy involvement.* Unpublished manuscript, Stanford University.

Piaget, J. (1951). *Play, dreams, and imitation in childhood.* New York: Norton.

Piaget, J. (1952). *The origins of intelligence in children.* New York: International University Press.

Pittman, T. S., Emery, J., & Boggiano, A. K. (1982). Intrinsic and extrinsic motivational orientations: Reward-induced changes in preference for complexity. *Journal of Personality and Social Psychology, 42,* 789–797.

Quattrone, G. (1985). On the congruity between internal states and action. *Psychological Bulletin, 98,* 3–40.

Ryan, R. M., Connell, J. P., & Deci, E. L. (1985). A motivational analysis of self-determination in education. In C. Ames & R. E. Ames (Eds.), *Research on motivation in education: Vol. II. The classroom milieu* (pp. 13–51). New York: Academic Press.

Schunk, D. H. (1984). Self-efficacy perspective on achievement behavior. *Educational Psychologist, 19,* 48–58.

Schunk, D. H. (1985). Self-efficacy and classroom learning. *Psychology in the Schools, 22,* 208–223.

Seligman, M. E. P. (1975). *Helplessness: On depression, development, and death.* San Francisco: W. H. Freeman.

Silberman, C. (1970). *Crisis in the classroom.* New York: Random House.

Singer, J. L. (1973). *The child's world of make-believe.* New York: Academic Press.

Sirotnik, K. A. (1983). What you see is what you get—Consistency, persistency, and mediocrity in classrooms. *Harvard Educational Review, 53,* 16–31.

Spence, K. W. (1956). *Behavior theory and conditioning.* New Haven, CT: Yale University.

Terrell, Jr., G., Durkin, K., & Wiesley, M. (1959). Social class and the nature of the incentives in discrimination learning. *Journal of Abnormal and Social Psychology, 59,* 270–272.

Weiner, B. (1974). *Achievement motivation and attribution theory.* Morristown, NJ: General Learning Press.

Weiner, B. (1979). A theory of motivation for some classroom experiences. *Journal of Educational Psychology, 71,* 3–25.

Weiner, B. (1980). *Human motivation.* New York: Holt, Rinehart and Winston.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92,* 102–107.

White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66,* 297–333.

White, R. W. (1960). Competence and the psychosexual stages of development. In M. R. Jones (Ed.), *Nebraska symposium on motivation* (Vol. 8, pp. 97–140). Lincoln, NE: University of Nebraska Press.

Winnett, R. A., & Winkler, R. C. (1972). Current behavior modification in the classroom: Be still, be quiet, be docile. *Journal of Applied Behavior Analysis, 5,* 499–504.