

THE EMPIRICAL EXPLORATION OF INTRINSIC MOTIVATIONAL PROCESSES¹

Edward L. Deci and Richard M. Ryan

DEPARTMENT OF PSYCHOLOGY
UNIVERSITY OF ROCHESTER
ROCHESTER, NEW YORK

I. Introduction	40
Intrinsic Motivation	40
II. Cognitive Evaluation Theory: Perceived Locus of Causality	43
A. Attribution and Motivational Subsystems	44
B. Performance Mediators	45
C. Other Rewards; Other Activities	46
D. Expectancy, Contingency, and Salience	48
E. Nature of the Task	50
F. Competition and Intrinsic Motivation	53
G. Effects of Control Structures	55
H. Failures to Replicate: The Behavioristic Perspective	55
I. External to Internal: The Importance of Self-Determination	58
III. Cognitive Evaluation Theory: Perceived Competence	61
A. Positive Feedback and Praise	63
B. Negative Feedback	67
IV. The Functional Aspects of Rewards	67
A. Factors in the Rwardee	68
B. Factors in the Situation (Expectancy, Contingency, and Salience Revisited)	69
C. Factors in the Rewarder	70
V. Intrinsic Motivation and Perceived Competence in the Schools	70
A. The Impact of Teacher Characteristics	71
B. Motivational Subsystems (Once Again)	73
C. Descriptive Information on School Children	75
VI. A Final Statement	75
References	76

¹Preparation of this chapter was facilitated by Research Grant MH 28600 from the National Institute of Mental Health to the first author.

I. Introduction

The study of motivation is intertwined with all areas of psychology and has been guided by many perspectives. Historically, there have been two major schools of thought in the psychological study of motivation: psychoanalytic theory (e.g., Freud, 1917/1949) and behavioral associationist theory (Hull, 1943). These two approaches are radically different in many respects, yet they share one fundamental assumption that is directly germane to our present concerns. That assumption holds that all behavior is basically carried out in an effort to reduce internal tension or stimulation and rests on a limited set of supposedly primary drives, such as those for food, water, and sex.

Increasingly this foundation of motivation theory has been seen as inadequate. In later psychoanalytic theory, Hartmann (1958) and White (1963) have asserted that there is an energy source inherent in the ego of the individual that is independent of the drives of the id. In experimental research on learning, reinforcement theorists began to discover that animals explored novel spaces and manipulated novel objects as if they were seeking additional stimulation rather than lessening inner excitation (Berlyne, 1966). Exploratory and manipulative behaviors defied extinction and even served as reinforcers for other behaviors (Butler, 1953).

Work in such diverse areas as cognitive development (Piaget, 1952), social motivation (McClelland, Atkinson, Clark, & Lowell, 1953), humanistic psychology (e.g., Maslow, 1954), and expectancy theory (Atkinson, 1964) also suggested the advisability of a motivational construct that was independent of the primary, tissue-based drives. In our work we assume such a motivation and refer to it as "intrinsic motivation."

INTRINSIC MOTIVATION

Intrinsic motivation has been investigated in a variety of ways at the physiological, psychological, and operational levels. Those who have focused on the psychological level have generally been guided by one of two general approaches: the incongruity theories and the competence and/or self-determination theories.

1. Incongruity Theories

This approach suggests that organisms are intrinsically motivated by a need to encounter stimulus events that are moderately discrepant from some internal standard; in other words, they seek stimulation that is moderately discrepant from their accustomed stimulation (Berlyne, 1978; Dember & Earl, 1957; Hunt, 1965; McClelland *et al.*, 1953; Piaget, 1952; Walker, 1973).

Hunt, for example, stated that for effective functioning, organisms need an

optimal amount of psychological incongruity between an internal standard and a stimulus event. An internal standard is simply some element of one's cognitive structure. For example, a child who has learned addition tables up through 10 plus 10 will have that as an internal standard; a person who has swum a maximum distance of 1 mile will have that as an internal standard. A stimulus event, such as the problem of 12 plus 11 or the goal of swimming a mile and an eighth, would provide a moderate discrepancy, so the child might be intrinsically motivated to solve the problem and the person might be intrinsically motivated to swim the mile and an eighth. Simply adding 10 plus 10 or swimming the mile provides no discrepancy and is therefore boring. On the other hand, an arithmetic problem of 127 plus 2481 or the goal of swimming 2 miles provides too much discrepancy from the existing standards and is therefore aversive. When the situation is either boring or aversive, people do not function as effectively as when there is moderate incongruity that stimulates their intrinsic interest.

Hunt's ideas have much in common with those of Piaget (1952), who has suggested that people seek moderately discrepant material to which they can accommodate, and with those of Berlyne (1978), who has suggested that people are inclined toward novel situations that provide conflicting cognitive elements requiring integration.

2. Competence and/or Self-determination Theories

White (1959) proposed the concept of competence to refer a person's capacity to deal effectively with his or her surroundings. People, he stated, are motivated to attain competence in their dealing with the environment, and this innate motivation energizes such things as exploratory play, aspects of cognitive development, and curiosity. White used the term effectance motivation to refer to this motivational propensity, which is ever present in the absence of homeostatic crises and which underlies much persistent, directed activity. Harter (1978) has also utilized the concept of effectance in her discussions of intrinsic motivation.

Bandura (1977) has presented a theory of behavior change that is based in the idea of efficacy. People, he suggested, will engage in behaviors only if they have expectations that they can do the behaviors efficaciously. His work is related to the idea of intrinsic motivation, yet Bandura has steadfastly refrained from positing any motivational underpinning to the importance of efficacy expectations. He has asserted that the idea of a generalized need for competence and self-determination has disutility because it is so vague. However, as we shall see in the following review of empirical research, the concept does have substantial heuristic value for integrating a wide range of research.

deCharms conceptualized intrinsic motivation in terms of the need for a sense of personal causation. People, he suggested, have a basic desire to experience themselves as causal agents, to view themselves as the originators of their own behaviors rather than pawns to external forces.

Recognizing the importance of striving for competence and personal causation, Deci (1975) defined intrinsic motivation in terms of the underlying need for a sense of competence and self-determination. The two, competence and self-determination, are inextricably related and generally covary in real-life situations. Yet, in a sense, self-determination (Deci, 1980) is the more fundamental component, for the attainment of competence must occur within the context of self-determination to be intrinsically rewarding. Competence acquisition that is forced by others rather than chosen by oneself is not intrinsically motivated. Fisher (1978), for example, found that when subjects' performance was constrained there was no correlation between the achievement of competence and intrinsic motivation, whereas when subjects had personal control there was a relationship between competence and intrinsic motivation.

3. *Intrinsic Motivation Defined*

Human beings are active organisms who are continually interacting with and adapting to their surroundings. They need to experience themselves as competent and self-determining in these interactions. Their sense of being competent and self-determining provides intrinsic gratification and is prerequisite for psychological health. The disruption of the experience of competence and self-determination has been shown to be deleterious to adaptive behavior and related to psychological disorders (Deci, 1980; Lefcourt, 1973; Seligman, 1975).

Intrinsically motivated behaviors are those behaviors that are motivated by the underlying need for competence and self-determination. As with all psychological constructs, operational definitions are necessary for research purposes. *Therefore, we operationally define intrinsically motivated behaviors as those that are performed in the absence of any apparent external contingency.* This is typically measured by observing behavioral persistence in a free-choice period following the removal of rewards or constraints. Several studies have also measured intrinsic motivation with paper and pencil measures of interest or enjoyment, thereby providing an additional operational definition of intrinsic motivation. We shall review research that has utilized either of these two operational definitions and their corresponding measures.

Let us characterize intrinsically motivated behaviors further. When they are intrinsically motivated, we suggest, people will be involved in an ongoing, cyclical process of seeking out (or creating) optimally challenging situations and then attempting to conquer those challenges. The idea of "optimal" here simply means that people have unique sets of abilities with regard to any given domain of activity and their attention will be directed toward those activities that require them to learn or to stretch their abilities a small amount.

In terms of the incongruity theories, one can understand such challenges in terms of an incongruity between an internal standard and a stimulus event. Optimal challenges require a modest amount of incongruity. We can see, there-

fore, that the incongruity theories and the competence and self-determination theories are quite compatible. The need for competence and self-determination leads people to encounter moderate incongruity and to create congruity from the incongruity.

Of course, people are not intrinsically motivated to engage in all kinds of behaviors that provide optimal challenges or moderate incongruity; they have preferences. Enduring a little more pain than one is accustomed to is a moderate incongruity and could provide an optimal challenge, yet people may prefer other types of challenges or incongruities as they strive to develop feelings of competence and self-determination. Those that are attractive can be distinguished from those that are not in terms of innate abilities and prior experiences. This review outlines processes through which activities and situations that provide moderate incongruity or optimal challenges may become either more or less intrinsically motivating as a result of various experiences.

II. Cognitive Evaluation Theory: Perceived Locus of Causality

Many recent studies have investigated the effects of extrinsic rewards, external constraints, and interpersonal communications on people's intrinsic motivation. In our laboratory, the general paradigm for the experiments has been to provide subjects with a mechanical, spatial relations puzzle called Soma—a puzzle that college students have generally found to be very interesting. We then introduce the experimental manipulation (e.g., reward some subjects and not reward others, or provide feedback to some subjects and not to others). Finally, we assess their intrinsic motivation following the puzzle solving by observing them in a free-choice situation. Subjects who spend more of their free-choice time working on the target activity are said to be more intrinsically motivated for that activity than subjects who spend less of their free-choice time working with the activity. The primary dependent measure of intrinsic motivation, therefore, is the number of seconds that subjects spend working on the target activity during the free-choice period. A supplemental measure used in some experiments was subjects' reported level of interest in or enjoyment of the activity.

In two early studies, Deci (1971, 1972b) explored the effects of monetary rewards on intrinsic motivation. The second investigation employed the paradigm described above, whereas the first employed a more elaborate three-session paradigm in which the first and third sessions provided the before and after measures of intrinsic motivation, respectively, whereas the second session contained the experimental manipulation of payments to half the subjects and no payments to the other half. In both experiments subjects worked on the Soma puzzles, with the experimental subjects being paid \$1 for each of the four puzzles that they were able to solve in the allotted time and control subjects receiving no

pay for the same activity. Intrinsic motivation was assessed using the free-choice measure wherein subjects were given an additional opportunity to work on the puzzle or engage in other activities with the experimenter absent. Results of both experiments indicated that the paid subjects evidenced a significant decrease in intrinsic motivation relative to the nonpaid subjects.

Results similar to Deci's were reported by Calder and Staw (1975b), who used "expressed interest" as their dependent measure. Thus, the phenomenon of undermining intrinsic motivation by extrinsic rewards emerged with a self-report, attitude-dependent measure as well as with Deci's free-choice, behavioral measure.

Utilizing the terminology employed by Heider (1958) and deCharms (1968), Deci suggested that the experience of being rewarded for the activity induced a shift in the perceived locus of causality for this behavior from internal to external, resulting in decreased intrinsic motivation. Whereas intrinsically motivated behavior is seen as internally caused, carrying out an activity in order to get a reward leads the actor to view his behavior as externally caused. In Deci's (1975) cognitive evaluation theory, this "change in perceived locus of causality process" was said to be one of two processes through which external considerations could affect a person's level of intrinsic motivation.

A. ATTRIBUTION AND MOTIVATIONAL SUBSYSTEMS

The concept of perceived locus of causality was introduced as part of Heider's commonsense psychology that has stimulated much current work in attribution theory. The general attribution approach, when applied intrapersonally, suggests that people make postbehavioral, cognitively determined inferences about their motivational or affective states after observing their actions. The cognitive inferences they draw are said to be causal antecedents of subsequent behavior. This approach, espoused by Bem (1972), Kruglanski (1975), Ross (1976), and others, has been widely used in interpreting the undermining of intrinsic motivation by extrinsic rewards. The notion suggests that the presence of extrinsic rewards leads to the attribution of an external cause of the behavior and therefore the absence of an internal one, viz., intrinsic motivation. The change in perceived locus of causality process as presented by Deci has often been interpreted as a function of attributional processes that work in the manner just outlined. However, we do not understand it in that way. We intend the statement of the process to be a heuristic description of the perceptions and cognitions that accompany changes in underlying motivational processes. We hold that the addition of rewards to a situation calls into play a different motivational subsystem (extrinsic rather than intrinsic) and that the resulting behavior (Soma puzzle solving in these experiments) becomes integrated into the extrinsic rather than the intrinsic motivational subsystem. The given behavior

becomes instrumentally linked to the reward and tends not to be performed in its absence. Phenomenologically, the person does the behavior for an external reason, viz., the reward. Referring to the locus of causality as external here is heuristically valuable because it describes the developed dependency between performance and the presence of the external reward or constraint. The motivational cause, of course, remains internal; it is the operation of the extrinsic motivational subsystem.

This phenomenon of rewards undermining intrinsic motivation under certain conditions has been replicated frequently, as will become apparent in this review. Some of the studies were reported in earlier reviews by Deci (1975), Condry (1977), and Lepper and Greene (1978a) and have been discussed in relation to education (Levine and Fasnacht, 1974), work motivation (Notz, 1975), and psychotherapy (Arkes, 1978).

The phenomenon is generally referred to as the "overjustification effect," a term introduced by Lepper, Greene, and Nisbett (1973). That terminology developed out of the attributional, self-perception framework (Bem, 1972) and therefore is theoretically tied to that conception. Therefore, we shall tend not to use the term "overjustification" because it implies the operation of a theoretical process that we believe is incomplete as an explanation of the phenomenon. Lepper and Greene (1978b) have also realized the limitations of the overjustification effect in the study of intrinsically motivated behavior and have called for moving beyond the exclusive use of the concept in explicating intrinsic motivation.

B. PERFORMANCE MEDIATORS

Deci asserted that the change in intrinsic motivation was caused by changes in motivational processes. Others, such as Calder and Staw (1975a), suggested that the changes in intrinsic motivation in Deci's studies may have been an "artifact" of performance differences. For example, the payments may have caused subjects to work harder and then become satiated or fatigued, thereby leading them to display less intrinsic motivation. In response to this suggestion, Deci, Cascio, and Krusell (1975) reported that there were no performance differences between the payment and nonpayment groups, so this alternative interpretation is ruled out and the motivation interpretation remains plausible.

We do, of course, believe that performance can mediate between reward structures and one's level of intrinsic motivation, although we are asserting that reward structures can also directly affect intrinsic motivation through the change in perceived locus of causality process, independent of any performance-mediated effects. The term "performance-mediated effect" means simply that (1) reward structures can affect one's performance of an activity, and (2) those performance effects can in turn influence one's level of intrinsic motivation. For

example, rewards could lead one to work faster and therefore become satiated or fatigued, or rewards could lead one to perform better at the activity and therefore feel good about one's performance. The satiation or fatigue and the satisfactions about one's performance could either lower (in the former case) or raise (in the latter case) one's level of intrinsic motivation.

McGraw (1978) surveyed many studies showing that rewards did affect performance. He concluded that rewards might be either detrimental to or facilitative of task performance, depending on two parameters. First, if the task is aversive, rewards will tend to facilitate task performance, presumably by adding some hedonically positive elements to the aversive situation. On the other side of the aversive-attractive coin, rewards may either enhance or diminish performance of an attractive task depending on a second parameter, viz., the algorithm vs. heuristic dimension. If an attractive task is well learned or has an algorithmic solution that is known or is easily discovered, rewards will tend to facilitate performance on the task. However, if the attractive task requires creativity, resourcefulness, and the use of ingenious heuristics, rewards will tend to impair performance (e.g., McGraw & McCullers, 1979). There is evidence, therefore, that rewards do affect performance.

Later in this contribution we shall review research demonstrating that the perception of one's performance as effective seems to enhance intrinsic motivation, whereas the belief that one's performance is ineffective seems to diminish intrinsic motivation. Therefore, performance differences can affect intrinsic motivation. These two types of evidence lead to the conclusion that rewards can affect intrinsic motivation through performance-mediated effects. However, we shall be primarily concerned with the effects of rewards on intrinsic motivation that are not mediated by such performance differences. These effects result from a change in motivational processes, the cognitive component of which is the change in perceived locus of causality.

C. OTHER REWARDS; OTHER ACTIVITIES

We reported three studies in which monetary rewards have decreased subjects' intrinsic motivation. We accounted for this phenomenon by invoking the process that Deci previously called a change in perceived locus of causality. Although we acknowledge that rewards may affect intrinsic motivation through determining the perceived effectiveness of the performance, we shall focus primarily on the direct, extrinsic influence on intrinsic motivation. If rewards affect intrinsic motivation through the change in perceived locus of causality process, then one would expect many rewards besides just monetary ones to decrease intrinsic motivation in this way. Several experiments have confirmed this expectation.

In one such experiment, Deci and Cascio (1972) used a modified

"negative-reinforcement" procedure. Utilizing the Soma paradigm described earlier, they told experimental subjects that if they were unable to solve a puzzle in the allotted time a buzzer would sound indicating that their time for that puzzle was up. Subjects were briefly exposed to the buzzer so they would know that it was quite noxious. Control subjects, in contrast, carried out the same task under the same conditions without learning of the buzzer. In this experiment, therefore, the reward for solving puzzles was avoidance of noxious stimulation, a situation analogous to the typical threat-oriented conditions of everyday life.

In this experiment, as in the money studies, the rewarded subjects displayed less intrinsic motivation (a marginally significant result) than nonrewarded people. There are, of course, alternative interpretations for this result. For example, the "threats" may have induced anxiety in the experimental subjects. However, in spite of the plausible alternative interpretations, we regard the finding as consistent with the perceived locus of causality process; although it does not provide unequivocal support, it fits into a larger picture of being one type of controlling reward that seems to undermine intrinsic motivation.

As another example of a nonmonetary reward, Lepper *et al.* (1973) rewarded preschool children by giving them a "good player award" for using attractive art materials. The outcome was a decrease in the children's intrinsic motivation. The researchers employed a free-choice measure that was separated from the manipulation phase of the experiment by several days, thereby showing that the intrinsic motivational decrement persisted over time and was not merely a transitory phenomenon. Further, because the Lepper *et al.* study utilized young children as subjects, their experiment added to the generalizability of the phenomenon.

Similarly, Anderson, Manoogian, and Reznick (1976) reported that both monetary rewards and good player awards produced decrements in the intrinsic motivation of lower socioeconomic, largely Afro-American, preschool children. And Greene, Sternberg, and Lepper (1976) also found such decrements using a token economy procedure with fourth- and fifth-grade children.

Several studies have obtained results that are generally congruent with the undermining of intrinsic motivation phenomenon, although they do not test the proposition directly. Kruglanski, Freedman, and Zeevi (1971), for example, found that rewarding Israeli high school students with a tour of a university psychology laboratory for their work on a variety of tasks significantly decreased their creativity and task recall relative to a nonreward group. Further, Benware and Deci (1975) reported that rewarding subjects for arguing in favor of a position they initially supported actually led them to believe less strongly in the position. Then too, Garbarino (1975) showed that when sixth-grade girls were rewarded with movie tickets for tutoring first graders, the former became more critical and demanding and less effective than their nonrewarded counterparts. Garbarino suggested that rewards create an instrumental orientation that has

deleterious social consequences. Such consequences, we assert, arise when people are shifted into an extrinsic rather than an intrinsic motivational orientation or subsystem.

Dienstbier and Leak (1976) discovered that persons who were paid to lose weight lost weight faster than nonpaid control subjects; however, when payments stopped, the former subjects regained some of the lost weight, whereas the control subjects continued to lose. Presumably, the paid subjects had come to believe there was an instrumental connection between weight loss and rewards so that cessation of the rewards caused a cessation of the instrumental behavior of losing weight. Also in keeping with our theme, T. S. Smith and Murphy (1978) found that symphony orchestra players expressed decreased satisfaction with their jobs as the judged quality of the orchestra, and so their pay, increased.

Deci, Benware, and Landy (1974) reported that subjects attributed less intrinsic motivation to others who received greater rewards for an activity than those who received lesser rewards. Therefore, it appears that rewards not only undermine people's intrinsic motivation for an activity but lead observers to assume that the rewarder is less intrinsically motivated.

D. EXPECTANCY, CONTINGENCY, AND SALIENCE

The finding that extrinsic rewards undermine intrinsic motivation for the rewarded activity seems quite robust. Experiments that employed several different rewards, several different activities, and variously aged subjects have produced the same results. There are, however, several limiting conditions to the process in which a change in perceived locus of causality leads to the undermining of intrinsic motivation. Those limiting conditions will continue to become evident throughout the remainder of this review, but we will consider three relevant dimensions in this section.

In the experiments discussed so far, rewarded subjects were told before they began working on the target activity that they would receive rewards for doing the activity. Therefore, the reward contingency was clear to the subjects before their initial engagement with the task; the rewards were expected. In such situations, where the reward contingencies were clear, perceived instrumentalities seemed to develop readily, resulting in the drop in intrinsic motivation. In the Lepper *et al.* (1973) study reported earlier, subjects who expected the good player award evidenced decreased intrinsic motivation relative to the no-reward controls. Subjects in another experimental group were given unexpected good player awards after they finished playing with the art materials. These subjects showed no decrements in intrinsic motivation relative to the control subjects. Thus, it appears that rewards need to be expected—the reward contingencies need to be clear—in order for intrinsic motivation to lessen. This, of course, makes good sense. If the effect of the reward is to create an instrumentality

between the behavior and the reward, this is less likely to occur if the activity has not been conducted in order to get the reward. The motivational orientation during the performance was wholly intrinsic. If one were to receive "unexpected" rewards several times, however, this could easily begin to establish an instrumental relationship between the activity and the reward. The point is that the undermining occurs when the activity becomes subsumed by the person's extrinsic motivational subsystem, that is, when the activity becomes instrumental for a reward rather than rewarding in itself, and the perceived locus of causality shifts from internal to external. This process is unlikely to occur when an unexpected reward is received on one occasion.

In one published experiment an unexpected reward seems to have caused decreased enjoyment of an activity, although a methodological peculiarity makes the study difficult to compare with the Lepper, Greene, and Nisbett investigation. In that experiment, Kruglanski, Alon, and Lewis (1972) gave prizes to half of their elementary school subjects who had been on winning teams in group game competitions, whereas the other half received no prizes. The prizes were awarded following the announcement of the winner, although no mention of the prize had been made until that time. Therefore, the prize appears to be a straightforward, unexpected reward. However, when the prizes were presented, the experimenter falsely stated, "As we said before, members of the winning team will be awarded special prizes as tokens of their victory." It is difficult to say in this case just what produced the lowered expressed enjoyment of the games in the rewarded subjects, so the study's status is unclear.

Another feature of reward administration that has stimulated discussion as it relates to the undermining effect is whether the rewards are made contingent upon the nature or quality of performance or are simply given for participation in the activity regardless of the quality or quantity of performance. The undermining effect has been obtained after performance-contingent rewards (e.g., Deci, 1971, 1972b, in which subjects received \$1 per puzzle solved) as well as following performance-noncontingent rewards (e.g., Lepper *et al.*, 1973, in which subjects received a good player award regardless of the quality of their drawings). Therefore, rewards of either type can produce the undermining effect. However, several studies have shown that performance-contingent rewards have a more powerful undermining effect. An archetype of performance-contingent rewards is the piece-rate payment systems, in which wages are a direct function of output. It makes sense in terms of the change in perceived locus of causality process that contingent rewards would have a more deleterious effect on intrinsic motivation, for the contingency emphasizes the instrumental nature of the activity. Four experiments that utilized monetary rewards (Deci, 1972a; Pinder, 1976; Pritchard, Campbell, & Campbell, 1977; Weiner & Mander, 1978) and one that utilized prizes (Harackiewicz, 1979) demonstrated that performance-contingent rewards decrease intrinsic motivation. All but the Pritchard *et al.* study com-

pared performance-contingent rewards to noncontingent rewards and found that contingent rewards tended to be more detrimental than noncontingent rewards. In fact, in the Deci (1972a) study, noncontingent rewards did not produce a decrement in intrinsic motivation.

In one study, Karniol and Ross (1977) found that performance-contingent rewards in conditions of high performance led to a higher level of intrinsic motivation than performance-noncontingent rewards. In this experiment with children, the instruction emphasized that the children should try to respond in a way that made a green light come on. The instructions emphasized the green light (as a source of positive performance feedback) much more than the rewards (marshmallows). Therefore, it was less a study of contingent rewards than a study of positive performance feedback conveyed through a green signal light. Later we will see that positive performance feedback increases intrinsic motivation, and we will return to a brief mention of this study at that time.

In sum, it appears that rewards which are contingent upon a specified level of performance are more deleterious to intrinsic motivation than rewards not having this relationship, although noncontingent rewards have also been shown in many instances to have the deleterious effect. In a later section we shall see that performance-contingent rewards can actually enhance intrinsic motivation when they are administered in a way that places emphasis on effective performance rather than on reward acquisition.

In order for rewards to undermine intrinsic motivation they must be a salient factor in the person's experience of the activity. Ross (1975) reported an experiment in which two groups of children were offered prizes for playing with a drum. For one group, the prize was under a box in plain view of the child; for the other group the prize was absent and there was no further mention of it during the performance. He found that the salient reward, the one in view of the subjects, produced a significant decrease in intrinsic motivation whereas the nonsalient prize did not. Apparently, rewards must be salient if there is to be an adverse effect on intrinsic motivation, although, as we will see later, salient rewards may either increase or decrease intrinsic motivation depending on other factors (namely the functional aspects of rewards; see Section IV).

E. NATURE OF THE TASK

Most of the studies of the effects of rewards on intrinsic motivation have employed a highly interesting task. With such tasks, rewards (particularly when salient, expected, and contingent) generally decrease intrinsic motivation. A few studies have examined the nature of the target activity as a factor influencing the undermining effect:

Arnold (1976), for example, acknowledged that most studies in this area have yielded the undermining effect, but he suggested that if the activity is

extremely highly intrinsically motivating, the intrinsic motivation should be impervious to the negative effects of extrinsic rewards. In his study "subjects" were recruited for a game rather than an experiment and no mention was made of the rewards. Subjects worked on a very interesting computer game and were either paid or not paid \$2.00 during their first session. The results indicated that rewards either left intrinsic motivation unchanged or enhanced it. In interpreting these results, we would note several points. First, the rewards were noncontingent, and as we saw previously, noncontingent rewards are less likely to decrease intrinsic motivation. Second, the subjects who received rewards were told of the rewards just before they began their actual experimental performance so they were recruited with no mention of money. Moreover, several events occurred before anything was said about money; a 10-min videotaped introduction to the game and a brief question and answer period. As a consequence of all this, they had been oriented to play the computer game before rewards entered their awareness, and we suggest that the rewards were relatively unexpected. Hence, the rewards in this experiment were really noncontingent, unexpected rewards, and both characteristics have been shown to lessen the deleterious effects of extrinsic rewards. A true test of Arnold's hypothesis would necessitate the use of contingent, expected rewards. We see no compelling reason to expect highly interesting tasks to escape the negative impact of extrinsic rewards, nor do we interpret Arnold's experiment as indicative that they do.

Calder and Staw (1975b) and Lee, Syrnok, and Hallschmid (1977) did experiments in which subjects were rewarded for working on either relatively interesting or relatively dull activities. Calder and Staw used college students as subjects and employed both an interesting and a dull jigsaw puzzle activity. Half the subjects in each condition were monetarily rewarded and half were not. The results revealed that paid subjects in the interesting puzzle condition expressed less enjoyment in a postexperimental questionnaire than did the nonrewarded subjects. In the interesting puzzle condition, therefore, the undermining effect was replicated. However, in the dull puzzle task, paid subjects expressed greater enjoyment than the nonpayment subjects. This finding is often referred to as a reinforcement effect and was interpreted by Calder and Staw as indicating that extrinsic rewards increase subjects' intrinsic motivation for dull tasks.

We regard their interpretation as noncompelling and inappropriate. A task that is dull and uninteresting is certainly not intrinsically motivated initially; typically it would be performed for extrinsic reasons, such as rewards or compulsion. We do not see how adding extrinsic rewards to a dull task (which is most probably an instrumental activity to begin with) could possibly increase intrinsic motivation for the activity. Rewards should increase satisfaction with the activity, but only by virtue of the activity's instrumentality for the attainment of extrinsic satisfaction rather than because of its intrinsic interest. Said somewhat differently, people rewarded extrinsically for doing something that they would

typically do only if rewarded should be more satisfied than other persons who are not rewarded for doing such an activity. However, that does not in any way speak to their level of intrinsic motivation. The result is somewhat parallel to the findings reported earlier that when rewards are added to an aversive task, performance is enhanced (McGraw, 1978). Rewards decrease the aversive elements of the situation, thereby improving performance, providing extrinsic satisfaction, and adding enjoyment. Part of the reason for confusion on this point is that the operational definitions of intrinsic motivation are not perfectly correlated with the psychological definition of intrinsic motivation. Whereas enjoyment and satisfaction with an activity are certainly related to intrinsic motivation and are therefore used as operational definitions of this motivation, they can also reflect other factors, such as the enjoyment of being extrinsically satisfied.

The study by Lee *et al.* used mentally deficient children as subjects. They worked on interesting vs. dull tasks and received rewards that had either high or low incentive value. These researchers found results similar to those of Calder and Staw. Our interpretation of this study is the same as we just outlined. Extrinsic rewards decrease intrinsic motivation, satisfaction, and enjoyment of intrinsically interesting activities, whereas extrinsic rewards increase extrinsic satisfaction and enjoyment of a dull activity, although they do not increase subjects' intrinsic motivation for the dull activity.

Kruglanski, Riter, Amitai, Margolin, Shabtai, and Zaksh (1975) have reported two experiments that bear theoretical similarity to the ones just described. Kruglanski *et al.* reasoned that if money were endogenous to an activity—in other words, an integral element of the activity (e.g., coin tossing)—then monetary rewards should increase intrinsic motivation. However, if the money is exogenous to the activity—in other words, not an integral element of it—then monetary rewards should decrease intrinsic motivation. Using “expressed interest” as their primary dependent measure, Kruglanski *et al.* found that subjects who were paid for money-exogenous tasks expressed less interest than their nonpayment counterparts, whereas subjects who were paid for money-endogenous tasks expressed greater interest than their nonpayment counterparts. Deci, Porac, and Shapira (1978) replicated one of Kruglanski's experiments and found that while payment for a money-endogenous task increased rated interest, it did not increase subjects' intrinsic motivation as measured by the standard free-choice measure. They reasoned that money-endogenous activities (like dull, boring ones) are ones that people tend to do for rewards; they actually are extrinsic activities. Such activities, whether dull or exciting, have been under the control of people's extrinsic motivational subsystems. Therefore, when people carry out “extrinsic activities” and receive extrinsic rewards for doing so, they will be more satisfied than if they perform the extrinsic activity without getting the extrinsic rewards. Again, however, that does not speak directly to the issue of their intrinsic motivation for the activity.

To summarize, research evidence as well as common sense indicate that the widely observed undermining of intrinsic motivation by extrinsic rewards does not occur unless there is some initial intrinsic motivation. The person being rewarded must be intrinsically motivated at the start, obviously, if his intrinsic motivation is to decline. Thus, leaving aside individual differences in people's attraction to particular activities, it is necessary to employ activities that are generally interesting and intrinsically involving in order to have a clear demonstration of the undermining effect. When activities are initially dull, boring, or money endogenous—in other words, when they are the types of activities people carry out largely for extrinsic rewards—the rewards will increase satisfaction with the activity, although there is no evidence to indicate that people's intrinsic motivation will be increased, nor is there any compelling theoretical basis for expecting it to be.

We suggest that it is important to start with a definition of intrinsic motivation that involves psychological substrates in order to make reasonable interpretations of experimental findings. These studies just reviewed seem to be excellent cases in point. Kruglanski *et al.* and Calder and Staw have tended to define intrinsic motivation as a postbehavioral, self-attribution while paying little or no attention to underlying motivational or affective processes. Such definitions, which are rather superficial in the dynamic or depth sense, facilitate the type of confusion that allows one to arrive at (what we consider) the false conclusion that extrinsic rewards will increase people's intrinsic motivation for a dull, boring task.

Lepper *et al.* (1973) usefully pointed out that rewards may get people engaged in activities they would not otherwise try but which they find interesting once they try them. Rewards therefore may play a part in people's discovering their intrinsic motivation for an activity, although that is quite different from saying that rewards increase people's intrinsic motivation for an activity.

F. COMPETITION AND INTRINSIC MOTIVATION

Competition is a component of many “play” activities; it would seem to be somehow intertwined with intrinsic motivation. Csikszentmihalyi (1975) has said that competition is one of the basic components of “autotelic” or intrinsically motivated activities, and McClelland *et al.* (1953) have suggested that achievement motivation involves competition against a standard of excellence. Deutsch (1962) spoke of competition in terms of two or more people or groups having directly opposing goals. This, then, would be competition as seen in the standard sporting activity in which one party wins and one party loses. It is important to distinguish between this latter use of the concept and that of McClelland *et al.* (1953) in which there need be only one person who is seeking to do well at some activity. Csikszentmihalyi (1975) made a similar distinction by differentiating the following two items: “measuring self against others” and

"measuring self against own ideal." We shall use competition in the former sense, in which there are two or more parties involved and each is specifically attempting to beat the other. We consider the latter usage—seeking to do well and meet one's own standard—to be mastery rather than competition. Kelley and Thibaut (1969) used the term "perfect competition" to refer to the so-called zero-sum situations where there is a perfect negative relationship between the wins of one side and the losses of the other. Kelley and Thibaut reported that pure competition tends to foster a mutual mistrust (often even deceit), and much research (e.g., Berkowitz, 1962; Deutsch, 1969) has indicated that competition may impair performance and facilitate aggression.

Deci, Betley, Kahle, Abrams, and Porac (in press, a) reported an experiment which investigated the effects of competition on intrinsic motivation. They reasoned that competition was an extrinsic element since attempting to win, per se, was extrinsic to the activity for its own sake. They therefore predicted that competition (i.e., trying to win) would decrease subjects' intrinsic motivation. To test their hypothesis they used a variant of the typical Soma puzzle paradigm and induced competition by instructing the actual subject and an experimental accomplice (posing as a second subject) to try to win by solving each puzzle faster than the other person.

It should be noted that many games have competition built into them as an integral element, whereas in this experiment the competition is, in a sense, exogenous to puzzle solving. In contrast, competition, although built into such games as basketball, is exogenous to shooting baskets well, to dribbling well, and to mastering other components of the game. Therefore, although competition (the *fact of winning or losing*, as opposed to mastery feedback) may be built in to some games, we assert that it is by nature an extrinsic element; its focus is on winning rather than engaging with the activity itself.

In the Deci *et al.* study, half the subjects were instructed to compete (i.e., to try to solve the puzzles faster than the other person) while half were simply instructed to work as quickly as they could so as to finish in the allotted time. As predicted, the results revealed that competition decreased the subjects' intrinsic motivation. This was particularly true for females; their score on the measure of intrinsic motivation was 115 sec (out of 480 sec of free-choice time) lower than their counterparts who did not compete, whereas the competing males had intrinsic motivation scores only 38 sec less than their noncompeting counterparts. This experiment was constructed so that each subject worked on three puzzles. In the competition condition the actual subjects were allowed to "beat" the confederate on all three. Thus, even though the subjects won, the competition undermined their intrinsic motivation, as measured by the standard free-choice measure.

Our interpretation of the results is that competition is by nature an extrinsic element which causes an external perceived locus of causality and engages a person's extrinsic motivational subsystem. As was seen in the Garbarino (1975)

study of tutoring, the extrinsic orientation tends to be accompanied by certain affective behaviors, such as demandingness and criticism. Competition is a particularly keen form of extrinsic relating because of its face-to-face nature; therefore one often finds face-saving behaviors, performance disruption, and emotionality—as for instance the increased aggression reported by Berkowitz (1962) in competitive settings.

G. EFFECTS OF CONTROL STRUCTURES

In several of the preceding sections we have reported a variety of studies which provide strong support for the hypothesis that certain kinds of extrinsic rewards decrease people's intrinsic motivation for interesting activities. According to cognitive evaluation theory, this occurs when the reward contingency creates a perceived instrumental relationship between the activity and the reward, thereby placing the behavior within the realm of the person's extrinsic motivational subsystem and changing the person's corresponding perceived locus of causality from internal to external.

Persumably, if various desired extrinsic rewards induce such a change in one's perception of causality, other types of external constraints and structures should produce the same results. Several studies have supported this conjecture. Amabile, DeJong, and Lepper (1976) found that when external deadlines were imposed on college students who were working on interesting word games they expressed less interest subsequent to the experience than control subjects who were not given deadlines. Similarly, Lepper and Greene (1975) reported that children who worked on an interesting puzzle under conditions of adult surveillance via a television camera procedure displayed less intrinsic motivation for the puzzle activity in a follow-up session than did nonwatched children. Therefore, both deadlines and surveillance, two factors integrally involved with externally imposed control systems, have been shown to undermine intrinsic motivation.

H. FAILURES TO REPLICATE: THE BEHAVIORISTIC PERSPECTIVE

A few studies in the literature have reported failures to support the undermining of intrinsic motivation by extrinsic rewards (Farr, 1976; Finegold & Mahoney, 1975; Hamner & Foster, 1975; Reiss & Sushinsky, 1975). These studies were formulated with a behavior theory point of view. Traditionally, behavior theory has assumed that rewarded behavior would be strengthened, a phenomenon referred to as a "reinforcement effect." Focus has been on specific, observable responses with little or no attention paid to psychological events. For example, Finegold and Mahoney defined intrinsic motivation as operant level performance, and Hamner and Foster used as the dependent measure of intrinsic motivation the subjects' performance during the payment period.

We suggest therefore that the concerns of the behavior theorists are in a fundamental sense different from ours. We begin with an interest in internal psychological phenomena and their effects on subsequent behavior. Accordingly, for our purposes the relevant data in an operant paradigm appear during the extinction phase and involve a comparison of rewarded and nonrewarded subjects during the extinction period. There is no way to separate the intrinsic elements of performance from the extrinsic elements while the reward contingencies are still in effect. Given the theoretical and methodological differences between our analysis and the behavioral analysis, we suggest that these studies have not contradicted cognitive evaluation theory.

Finegold and Mahoney (1975) did a "token-economy" type of experiment with children. They observed children playing with a dot connection activity during a baseline phase and then rewarded the youngsters by giving them tokens (that could be exchanged for prizes) in accord with the number of dots connected (more tokens for more dots connected). Finally, they observed the children during two more baseline phases in which there were no rewards. They reported that there were sharp performance increases when rewards were introduced and that the postreward baseline performance was not lower than the prereward baseline performance. They therefore claimed failure to support the undermining effect.

There are aspects of this experiment that we believe vitiate the conclusions drawn by the authors. There were only five subjects, so their conclusions must be considered tenuous. More importantly, there was no nonreward group to control for extraneous factors, so there was no basis for drawing conclusions about the effects of rewards. For example, a nonrewarded group may have evidenced substantially higher responding during the posttreatment phase, thereby indicating relative decrements for the rewarded group.

As we mentioned above, the Hamner and Foster study has a similar shortcoming. They measured performance on and interest in the task during the period when reward contingencies were in effect. Their experiment used both a dull task and an interesting one—although it should be noted that both tasks were overlearned tasks (transcribing numbers with dull vs. interesting content) which required no creativity and were not in any way challenging. They claimed failure to support the undermining of intrinsic motivation; however, we assert that their interpretation of the results was inappropriate since they did not employ an intrinsically motivating task and did not look at behaviors and attitudes subsequent to the reward phase.

Farr, Vance, and McIntyre (1977) also reported a failure to support the undermining effect predicted by cognitive evaluation theory. Yet a careful inspection of their results shows considerable ambiguity. In the first of their two empirical studies they found a highly significant decrement in the intrinsic motivation of contingently rewarded subjects relative to nonrewarded subjects on

the free-choice measure of intrinsic motivation but not on an attitudinal measure. In their second study there was no statistically significant effect for rewards. From these studies they concluded nonsupport for the undermining effect. Yet that conclusion is unwarranted. In fact, with the most important dependent measure they found strong support in the first of the two studies, and in the second study they found a trend in the direction of the undermining effect ($F = 1.55$; $p < .13$), thereby suggesting that rewards tended to affect intrinsic motivation. It is always difficult to interpret failures to reject the null hypothesis, so even if there had been no significant findings in their studies, the conclusion would need to be tempered.

Farr *et al.* did make a very interesting point in their paper. They reported that their free-choice data tended to be bimodally (rather than normally) distributed, and that the same was true for Deci's (1971) data. That point deserves investigation. It suggests one of two things. The less interesting possibility is that it is a function of the particular measure, that is, that some people tend to enjoy the target activity and some do not. The second and more interesting possibility is that the undermining effect, although on average significant across all subjects, really exists primarily for some subset of the population. If the latter hypothesis is correct, it would be very interesting to determine what characteristics distinguish the people whose intrinsic motivation will be undermined by extrinsic rewards from those whose intrinsic motivation will not be undermined.

Reiss and Sushinsky (1975), criticizing the "overjustification" experiments for utilizing only single-trial reinforcement procedures, reported two studies. In the first they used a single-trial reinforcement procedure with children and obtained a replication of the overjustification effect previously found by Lepper *et al.* (1973) and Greene and Lepper (1974). In the second experiment, however, they utilized a multiple-reinforcement procedure and reported increased intrinsic interest following token reinforcement. They therefore concluded that the overjustification effect was in actuality a short-term distraction effect and that rewards will generally enhance intrinsic motivation. However, the primary difficulty with their results, as noted by Lepper and Greene (1976), was that like Finegold and Mahoney they did not use a no-reward, control group. Although the subjects' interest in the target activity may have increased from pre- to posttreatment, it is impossible to know whether that is caused by reinforcement, passage of time, increased familiarity with the target activity, or any one of a host of other factors. With no control group, the data are impossible to interpret. Further, R. W. Smith and Pittman (1978) tested the "distraction" interpretation and found no evidence for it.

Some people who employ the behavioristic perspective to investigate the undermining of intrinsic motivation by extrinsic rewards still do not accept the phenomenon. Therefore, they tend to discredit the experimental procedures which have purported to demonstrate the effect. Others agree that such an effect

may exist, but they then offer a reinforcement account of the effect. For example, Reiss and Sushinsky acknowledged that a decrement in interest may occur with a single-trial reinforcement procedure. Moreover, Scott (1976), although asserting that no good evidence exists for an undermining effect, provided a behavioral explanation for such a phenomenon.

The essence of a behavioral explanation (Mawhinney, 1979) is the assertion that situations have multiple reinforcing contingencies and that the introduction of rewards may distract attention from the rewarded activity (Reiss & Sushinsky, 1975), interfere with the optimal duration of the activity (Mawhinney, 1979), or change the contingencies so that the withdrawal of the new contingencies which control the behavior will result in a lowered response rate for the target behavior (Scott, 1976).

Deci (1976) replied to Scott's critique by noting that his assertion about a reinforcement explanation being preferable to a cognitive explanation is largely a statement of preferred metatheory. Scott began with the assumption that a reinforcement explanation is best and then used this formulation as an alternative explanation to Deci's. Given the behavioristic metatheory, Scott was primarily concerned with the way classes of reinforcing events affect the probability that organisms will emit certain classes of behavior. We want to explicate the psychological processes involved in the motivation of behavior and with the quantitative and qualitative differences in behaviors that are governed by what we have called intrinsic and extrinsic processes. Much of what concerns us is deliberately ignored by a behavioral analysis.

I. EXTERNAL TO INTERNAL: THE IMPORTANCE OF SELF-DETERMINATION

In the preceding sections we reviewed considerable evidence indicating that controlling extrinsic rewards and constraints will often decrease people's intrinsic motivation for the rewarded activity, as they perceive an instrumental relationship between the activity and the reward or the constraint. The development of a perceived instrumental relationship between the behavior and reward involves a shift in the motivational subsystem that organizes and governs the behavior. Whereas the behavior had initially been in the domain of the intrinsic subsystem, it now moves into the domain of the extrinsic subsystem. The cognitive component of this shift is what we have referred to as the change in perceived locus of causality.

The decrease in intrinsic motivation has usually been attributed to a shift from internal to external causality. This is largely a reflection of the fact that the experimental research has explored the effects of rewards and constraints rather than the effects of the absence of rewards and constraints.

Actually, the perceived locus of causality may shift in either direction—from external to internal or from internal to external—depending on whether

conditions fostering self-determination or non-self-determination are present. In the absence of external rewards and constraints, when people are free to do what they want, they should perceive the locus of causality to be internal. Their behavior in these situations could become governed by the intrinsic rather than the extrinsic motivational subsystem, the behavior would not be seen as instrumental to an external reward or constraint, and the locus of causality would be perceived as internal. They would feel self-determining.

In therapeutic and affective educational settings the aim of treatment is to foster self-determination and develop a perceived internal locus of causality (Ryan & Deci, 1980). Clients are encouraged to accept responsibility for their behavior so that treatment changes will persist in the absence of the therapeutic setting. This shift from external causality to internal causality is typically more difficult to accomplish than the shift from internal to external since in essence it involves not controlling behavior with readily manipulable external events rather than controlling it with such events. Nonetheless some research has been conducted which addresses the shift from external to internal causality.

Zuckerman, Porac, Lathin, Smith, and Deci (1978) sought to determine whether subjects who were given a modest amount of additional self-determination relative to other subjects not provided with the additional self-determination would show increased intrinsic motivation for the target activity. In this study, yoked pairs of college student subjects solved Soma puzzles. One member of each pair was given a choice as to which three of six puzzles to work on, and further, as to how to apportion the 30 min available for puzzle solving to the three chosen puzzles. The other member of each yoked pair was assigned the puzzles and time allotments chosen by the first person.

Results indicated that subjects who chose the activities and time allotments—in other words, who had additional self-determination—were more intrinsically motivated than subjects performing the same activity without choice. The "self-determining" subjects spent an average of 94 sec more of free-choice time (out of 480 sec available) working on the puzzles than did their yoked counterparts. They also indicated a greater willingness to return to the laboratory for additional puzzle solving than the subjects who had not been given the choice of puzzles. Both effects were statistically significant.

Because the "self-determining" subjects selected which puzzles they would work on, they might have chosen configurations that were easier for them, so that performance differences might have mediated the intrinsic motivation effects. To test this possibility the authors analyzed the average time to solve each puzzle and also the average number of puzzles not completed. There were no differences between the choice and no-choice groups on either measure (each of which yielded an *F* of less than 1.0). Further, an analysis of covariance was performed using both of the performance measures as covariates, and the significant main effect still remained on the dependent measures. Therefore, it seems clear that the

opportunity for self-determination in regard to some activity enhances one's intrinsic motivation for the activity, presumably by facilitating an internal perceived locus of causality for performance of the activity.

Swann and Pittman (1977) reported experimental results that corroborated those of Zuckerman *et al.* They utilized children who played with an interesting drawing game. Half of their subjects were assigned the target activity, while the others were told that they could select which game they wanted to play with, although it was quickly added that since they were sitting in front of the drawing game they might as well start with it. Thus, the "choice" children were given the "illusion of choice" rather than actual choice about which activity to play with. The results indicated somewhat greater intrinsic motivation in the choice group than the no-choice group.

The "illusion of choice" manipulation has become a prominent one in experimental social psychology and deserves a few words of comment. The manipulation is intended to make people believe that they have choice when in fact they are induced by the experimenter to behave in a certain way. We suggest that this is a subtle form of control rather than an opportunity for self-determination. Therefore, we hypothesize that although the manipulation may work to enhance felt control over the short run it could decrease one's felt control and intrinsic motivation over a prolonged period. We know of no evidence on this matter, although relevant evidence would be important, for if the illusion of choice is really a subtle form of control, then the manipulation is not satisfactory for studying self-determination and self-control.

We have seen that choice of puzzles increased intrinsic motivation for puzzle solving and that the illusion of choice increased intrinsic motivation for a play activity. Fisher (1978) has shown that personal control over performance also increases subjects' intrinsic motivation. In her study, half the subjects was given puzzles in which difficulty levels constrained their performance to either low, medium, or high. The other subjects were given puzzles in which the moderate difficulty level gave them freedom to determine their own performance level. She found that even when matching for performance, the subjects with control of their performance felt freer and were more intrinsically motivated than constrained subjects.

A study by Margolis and Mynatt (1979) has shown that when subjects were given a choice about which rewards they would receive, the rewards did not undermine intrinsic motivation, even though the same rewards did undermine intrinsic motivation for a no-choice group. Those who selected the size of their own rewards were comparable to nonrewarded control subjects and were significantly more intrinsically motivated than subjects who were administered the same rewards that had been selected by their yoked counterparts. Thus, feelings of self-determination (and the concomitant perception of an internal locus of causality) seem to enhance intrinsic motivation. Further, feelings of self-

determination that result from the self-administration of rewards may counteract the deleterious effects of the controlling aspect of the rewards and help to maintain an internal locus of causality. This latter conclusion remains somewhat tenuous, however, since a study by Dollinger and Thelen (1978) found that children who self-administered rewards when they thought they had done well showed decrements in intrinsic motivation. The reward involved their placing a "star" on their good player award which was on a bulletin board. We suggest that the reason these self-administered rewards decreased intrinsic motivation (rather than fostering an internal locus of causality and maintaining their intrinsic motivation) was that the instructions emphasized self-evaluation and may have elicited an evaluation apprehension that made the self-administration of rewards a somewhat aversive controlling experience.

Recent research on attribution theory and therapy also has relevance to our hypothesis that situational factors, such as the absence of extrinsic controls and the encouragement of choice, will strengthen the perception of an internal locus of causality and in turn increase intrinsic motivation. For example, Nentwig (1978) reported that modifications in smoking behavior were more likely to persist following treatment if clients perceived the cause of the modifications to be internal.

III. Cognitive Evaluation Theory: Perceived Competence

So far we have discussed the proposition that intrinsic motivation will be affected when elements of a situation—for example, the presence or absence of rewards and constraints and the opportunity or lack thereof for choice—cause a shift in perceived locus of causality from internal to external or from external to internal.

Deci (1975) has proposed that there is a second process through which one's intrinsic motivation may be affected. Intrinsic motivation is defined in terms of people's needs for competence and self-determination. The perceived locus of causality process is based in feelings and perceptions of self-determination. The second process is based in feelings and perceptions of competence. Intrinsic motivation will be affected if there is a change in one's perception of being competent. Perceiving oneself as competent at an activity will increase one's intrinsic motivation for the activity; perceiving oneself as incompetent will decrease one's intrinsic motivation for the activity. We said earlier that self-determination is the more fundamental of the two intrinsic needs. We now assert that one's perception of competence or incompetence must occur within the context of self-determination to affect intrinsic motivation. If one is forced to acquire competence at an activity, the activity will not be intrinsically motivating. Similarly, if one is forced to do badly it will not undermine intrinsic motiva-

tion since the poor performance will be understood as a result of the coercion. Fisher (1978) found support for this assertion. She reported that subjects whose performance had been constrained showed no correlation between felt competence and intrinsic motivation, whereas subjects whose performance had not been constrained did show a significant correlation.

The current statement of the second process through which intrinsic motivation can be affected differs from the 1975 statement of the process in two ways. First, the current statement utilizes "perceptions" of competence rather than "feelings." This was done so as to parallel the first process, which is stated in terms of "perceptions" of the locus of causality. Of course feelings accompany perceptions: people feel self-determining when they perceive the locus of causality to be internal and people feel competent when they perceive themselves as competent. The use of perceptions in both processes is done for consistency, since the theory is called a cognitive evaluation theory. The second difference between the 1975 and the present statement of the second process involves the separation of the self-determination and competence components of intrinsic motivation. The first process of cognitive evaluation theory is oriented around the need for self-determination; it involves perception of the locus of causality and feelings of self-determination. The second process is oriented around the need for competence; it involves perceptions of competence and feelings of competence. The 1975 statement of the second process employed "feelings of competence and self-determination"; we now assert that feelings of competence accompany the second process and that feelings of self-determination accompany the first process. Self-determination comes into the second process only insofar as one's perception of competence or incompetence must exist within the context of self-determination to affect one's intrinsic motivation.

When an informational input increases one's perceptions of (self-determined) competence it should enhance one's intrinsic motivation; when it decreases one's perceptions of (self-determined) competence it should diminish one's intrinsic motivation. For example, if one received positive feedback about a puzzle solution the person will have enhanced intrinsic motivation to move on to a new puzzle problem. If the person knows the solution to the old problem, the old problem will not be intrinsically interesting but the activity of solving those puzzle problems will. Each new puzzle needs to be a challenge and the person will be more intrinsically motivated to engage in that type of puzzle problem.

Ross (1976) made a point similar to Deci's. Utilizing an attribution framework, he suggested that if rewards provide competence cues they will cause an attribution of intrinsic motivation. Our point of divergence with Ross' attribution position is that we maintain that the changes that occur are changes in motivational process that have cognitive and affective components. The attributional changes are the cognitive component of the changes that theoretically, we assert, are organized by motivational changes.

There is considerable empirical evidence in support of the change in perceived competence hypothesis, just as there was in support of the change in perceived locus of causality process.

A. POSITIVE FEEDBACK AND PRAISE

More than a dozen experiments, variously utilizing children, students, and adults, have investigated the effects of positive feedback. Many authors have used the terms verbal rewards, praise, and positive feedback interchangeably. As we will see later, verbal rewards—like other rewards—can either enhance or diminish intrinsic motivation, and we assert that verbal rewards which increase intrinsic motivation are ones emphasizing competence feedback, whereas those decreasing intrinsic motivation are ones that are administered controllingly, in other words, administered to achieve a particular behavioral outcome. Thus, while verbal rewards may either increase or decrease intrinsic motivation, *positive competence feedback should always increase intrinsic motivation*. This will be explicated later in this section and in Section IV.

Anderson *et al.* (1976), in their study with lower socioeconomic 4- and 5-year-olds, found that verbal rewards increased children's intrinsic motivation. The rewards were such statements as "That's real nice"; the activity was drawing; and the subjects were about two-thirds female.

Utilizing a slightly different paradigm, Martin (1977) found that after children had been praised for playing with a target activity they preferred that activity to other activities on which their behavior had not been praised. Further, their preference for the verbally rewarded activity seemed to generalize to other activities that were similar to the verbally rewarded one.

Swann and Pittman (1977) reported that verbal rewards increased the intrinsic motivation of children, although in their study the verbal rewards were paired with contingent tangible rewards so it is difficult to know whether the increased intrinsic motivation resulted from verbal rewards, the tangible rewards, or some interaction of the two.

Dollinger and Thelen (1978) and Lonky (1978) reported that verbally rewarded children did not differ from no-reward children in terms of their intrinsic motivation, although Lonky reported that subjects high in locus of control (internals) seem to have increased, while subjects low in locus of control (externals) seem to have decreased. He employed the Bialer (1961) scale for locus of control.

Boggiano and Ruble (1979) found that self-administered, positive competence feedback increased the intrinsic motivation of 9-11-year-olds, although it did not affect 4-6-year-olds. The information was taken by the children from a table of norms, so it is possible that the younger children did not adequately understand that they had performed well.

To summarize the studies with children, positive competence information—generally administered as verbal feedback—tended to increase intrinsic motivation, although this finding failed to appear in two studies. In one of them, however, the failure seems to have been caused by the averaging of an increase for internal locus of control subjects and a decrease for external locus of control subjects.

Experiments on the effects of positive feedback and praise that have utilized adults have yielded a more complex set of findings than those utilizing children.

Harackiewicz (1979) found that verbally rewarding high school students for solving hidden-word puzzles increased their intrinsic motivation on a free-choice measure and their enjoyment of the activity. About 70% of these subjects were males, and there were apparently no sex differences. Deci (1971) found that positive feedback to subjects, who were predominantly males, increased their intrinsic motivation relative to a no-reward, control group.

In the Arnold (1976) experiment with a computer game as the target activity, subjects who performed better reported higher feelings of competence than poorer performers, and those with higher felt competence in turn displayed greater intrinsic motivation as evidenced by a greater willingness to return for future sessions with the target activity. In this study there was apparently no analysis for sex effects. We see from these three studies that both positive verbal feedback and positive feedback that is "self-administered" from successful performance appear to enhance intrinsic motivation.

A study by W. E. Smith (1974) appears at first blush to have yielded results that are contradictory to those of Harackiewicz (1979), Arnold (1976), and Deci (1971). In his study, college student subjects were given "anticipated social rewards" for learning about art. The results showed that intrinsic motivation (with a free-choice measure) decreased for the anticipated social reward group. To induce the anticipation of social rewards, the experimenter emphasized in the instructions that the subject's work would be evaluated by the experimenter. These subjects received positive written evaluations following their performance and subsequently displayed less intrinsic motivation than nonrewarded, control subjects. Although this study was interpreted as indicating that social rewards (in the form of positive feedback) decreased intrinsic motivation, our interpretation is different. The most salient aspect of the experimental induction seems to be the emphasis on evaluation of the subjects. Evaluation lends an extrinsic character to feedback and is often experienced as highly controlling and aversive (e.g., Amabile, 1979, found that evaluation interfered with subjects' creativity). Thus, even when the final feedback is positive, the evaluation apprehension can undermine intrinsic motivation by making the activity instrumental to a positive evaluation. We understand the Smith results, like those of Dollinger and Thelen (1978) mentioned earlier, as resulting from the subject's reaction to being evaluated. There is no contradiction, therefore, between these results and the

findings of enhancement of intrinsic motivation through positive feedback; the two are complementary.

There has been some indication in other studies that verbal rewards affect adult males and adult females differently, although this issue seems unsettled. Deci, Cascio, and Krusell (1975) reported that verbal rewards increased the intrinsic motivation of males but decreased the intrinsic motivation of females. This rather dramatic finding had been suggested in an earlier study (Deci, 1972b).

Carone (1975) replicated the Deci *et al.* study with females and also found that praise decreased their intrinsic motivation. In contrast, Weiner and Mander (1978) found that positive feedback to females increased their intrinsic motivation (the later finding was only marginally significant).

How then are we to make sense of these apparently contradictory findings? We said above that positive information about one's competence should increase intrinsic motivation through the change in perception of competence process. One would suspect, therefore, that any verbal praise or any positive feedback should initiate this process and increase intrinsic motivation. However, one must realize that verbal praise can mean many things. For example, people may offer praise as an ingratiation strategy or as a means to manipulate or cajole the praised person into doing something he or she does not want to do. In other words, praise, like money or threats, can be very controlling and therefore be negatively experienced by the person receiving the praise.

Deci (1975) suggested that all rewards, whether money, praise, candy, or trips to Europe (and in fact all situations in general), have two *functional properties*. They have a *controlling aspect*—that aspect which satisfies extrinsic needs and creates instrumentalities between behavior and rewards—and an *informational aspect*—that aspect which provides people with positive information about their self-competence or efficacy. When the controlling aspect of a situation is salient, it will initiate the change in perceived locus of causality. The salient presence of controlling, extrinsic rewards instigates a change from internal to external causality with a concomitant decrease in intrinsic motivation and a gratification of extrinsic needs. The salient absence of extrinsic rewards or constraints can initiate a change from external to internal causality with the concomitant strengthening of intrinsic motivation. If, in contrast, the informational aspect of a reward (or other situational factor) is more salient, it will initiate the change in perceived competence process, increasing intrinsic motivation when the information implies competence and decreasing intrinsic motivation when the information implies incompetence.

Now let us consider the sex differences reported in the Deci studies in light of the two functional aspects of rewards. Deci (1975) suggested that for females the controlling aspect of the verbal praise appears to have been more salient, resulting in decreased intrinsic motivation through the shift of perceived locus of

causality, whereas for males the informational aspect seems to have been more salient, resulting in increased intrinsic motivation through the enhancement of perceived competence. He reasoned that with traditional socialization practices girls have learned to be more dependent and interpersonally focused, whereas boys have learned to be more independent and achievement focused. A study by Alegre and Murray (1974), which showed that females "condition" more readily with verbal reinforcement than do males, lends support to Deci's interpretation.

If Deci's interpretation is correct, how can other discrepancies be reconciled? First, consider the apparent contradiction between the results of Deci *et al.* and Carone (1975), on the one hand, and those of Weiner and Mander (1978), on the other. In the Deci experiments and the Carone experiment, subjects were praised at the end of each puzzle on which they worked. The praise was regular and salient in their experience. It was interpreted, therefore, as either controlling (by females) or informational (by males) and caused the observed effects. In the Weiner and Mander study, the procedure was quite different. At the end of all their problem-solving work, the verbally rewarded subjects were told that they did better than average. Thus, the feedback was not delivered as salient "praise" during their performance. Instead, it was simply positive information about their competence; hence, it enhanced their intrinsic motivation.

The important point is that females as well as males will become more intrinsically motivated when they receive positive competence information. However, the specific reward of praise tends to be more controlling for females and more informational for males. When verbal feedback is administered to females in a more informational way, as was the case in the Weiner and Mander study, it will of course increase their intrinsic motivation. We have noted, however, that if the positive feedback is given in a highly evaluative fashion, the controlling nature of the evaluation may override the information contained in the feedback and decrease the intrinsic motivation of both males and females (e.g., W. E. Smith, 1974).

It is necessary also to take note of the fact that there appeared to be no sex differences in the effects of praise on little children, only on adults. Presumably, either the socialization procedures have not had sufficient impact by the time a child is 3-6 years old to result in the type of sex differences observed in adults, or alternatively, the socialization procedures used in the late 1960s and the 1970s (which were applicable for the children in the reported research) were somewhat different from those of the 1950s (which were applicable to the adults in the reported research).

A study by Blanck, Jackson, and Reis (1979) would seem to argue for the latter. They reported that praise administered in the same fashion as in the Deci studies increased the intrinsic motivation of both males and females. They argued that consciousness of sex roles and changing beliefs about sex-typed behaviors and activities have lessened the tendency for praise to be interpreted differently

by the two sexes. They found that women were more intrinsically motivated for feminine sex-typed tasks than masculine sex-typed tasks (the researchers used the same task for both but created a masculine vs. feminine set for the activity) and that males were more intrinsically motivated for masculine sex-typed tasks than feminine ones, but that the differential effects of praise that appeared in studies from the early part of the decade no longer appear, at least for the achievement conscious undergraduate women in their study.

B. NEGATIVE FEEDBACK

The studies reported above have confirmed that people's intrinsic motivation will increase when their perceptions and feelings of (self-determined) competence increase. Similarly, we hypothesized that people's intrinsic motivation will decrease when their perceptions and feelings of (self-determined) competence are diminished. Studies by Deci and Cascio (1972) and Deci, Cascio, and Krusell (1973) have supported this hypothesis. Employing the standard Soma paradigm, these investigators found that negative feedback, whether verbally administered by the experimenter or self-administered through failure at the target activity, decreased subjects' intrinsic motivation as measured by free-choice involvement with the target activity.

It is important to realize that not all so-called negative feedback will decrease intrinsic motivation, only that which signifies that one is incompetent. For example, trial-and-error learning is perhaps an archetype of intrinsically motivated behavior. People try things and sometimes find that they were wrong; however, that information may be useful in helping them figure out the solution. It does not imply incompetence; it gives clues toward competence. The nature of the "negative" feedback is important: If it implies incompetence it will decrease intrinsic motivation; if not, it will not.

IV. The Functional Aspects of Rewards

In Section III, A, we discussed Deci's proposition that rewards have two functional properties: a controlling aspect, which satisfies extrinsic needs and creates instrumentalities between behavior and rewards, and an informational aspect, which provides competence feedback. The relative salience of the two aspects is hypothesized to determine whether the rewards will increase or decrease intrinsic motivation. If the controlling aspect is more salient, it will provide extrinsic satisfaction, as we noted earlier for the Calder and Staw and Kruglanski *et al.* studies. Further, it will decrease intrinsic motivation by inducing a change in perceived locus of causality from internal to external. If the informational aspect is more salient (and if the information is positive), intrinsic

motivation will increase through a change in perceptions of competence. (Of course, if the information is negative, intrinsic motivation will decrease.)

As a preliminary test of the hypothesis, Deci and Porac (1978) reported a pilot study in which two groups of subjects were paid \$.50 for each of four puzzles they solved. Subjects in one group were simply given the payments in the standard fashion of earlier studies. Subjects in the other group were told that they would receive \$.50 for each puzzle they solved faster than 80% of previous subjects, \$.25 for each puzzle they solved faster than 50% of previous subjects, and no pay when they were in the bottom half. In fact, they, like the other group, always received \$.50 when they solved a puzzle and no money when they failed to solve one. The results showed a significant difference in the intrinsic motivation of the two groups. This study was only preliminary, yet it suggested that even monetary rewards will affect intrinsic motivation differently depending on whether they are primarily controllers or primarily conveyors of positive competence information.

Before we report other studies that have supported the present hypothesis, let us raise the question of what determines which aspect of a reward will be more salient? Our answer is that there are factors in (1) the rewarder, (2) the situation, and (3) the rewarder that will determine which aspect of the reward is more salient. We shall consider these categories in turn, reporting studies that support the general hypothesis as well as more specific ones related to the three categories of factors.

A. FACTORS IN THE REWARDEE

Individuals differ on every psychological dimension that has ever been investigated. A variety of these factors is likely to affect the way they interpret rewards and therefore the effects of those rewards on their intrinsic motivation. There has been little direct attention paid to person factors, in the recipient of rewards, that determine how those rewards will be perceived; however, in preceding sections we have reported research indicating two such factors that have significantly mediated the effects of rewards. The first is sex of the subject in relation to praise. On average it appears that males vs. females, presumably because of socialization practices, have come to respond differentially to the controlling vs. informational aspect of praise. Further, the study by Lonky suggests that the locus of control variable may mediate subjects' responses to praise with praise increasing the intrinsic motivation of internal children and decreasing it for external children. Baron and Ganz (1972) reported a related result. Internal versus external locus of control children responded differentially to intrinsic vs. extrinsic feedback. Internal children worked better with intrinsic feedback; external children, with extrinsic feedback. We know of no study

that has isolated factors in the rewarder that mediate the salience of the two aspects of rewards other than praise.

B. FACTORS IN THE SITUATION (EXPECTANCY, CONTINGENCY, AND SALIENCE REVISITED)

There have been a few studies that have specifically manipulated situation variables to investigate their effects on the relative salience of the aspects of rewards and in turn on intrinsic motivation. The Deci and Porac pilot study mentioned at the beginning of Section IV was one such example. A more substantive investigation of this matter has been reported by Enzle and Ross (1978). They found that when highly valued monetary rewards were contingent upon "skilled" performance the rewards increased intrinsic motivation, whereas the same rewards given simply for doing the task decreased intrinsic motivation. When the rewards conveyed positive competence information, they enhanced subjects' interest in the puzzle activity. Rosenfield, Folger, and Adelman (in press) similarly have reported that when rewards reflect competence they will increase intrinsic motivation, whereas they will decrease intrinsic motivation when they do not. Finally, Pittman, Davey, Alafat, Wetherill, and Wirsul (in press) found that when verbal rewards were administered "informationally" they enhanced intrinsic motivation, although when they were administered "controllingly" they tended to decrease or leave unchanged subjects' intrinsic motivation.

The Enzle and Ross study can be viewed as an investigation of the contingency question outlined in Section II, D. Most studies that investigated the effects of contingent rewards found that they undermined intrinsic motivation, whereas this study found an enhancement. We are suggesting now that it is not contingency per se that determines whether rewards will undermine or enhance intrinsic motivation, for contingencies can be constructed very differently. They too can be set up to control behavior or to provide competence feedback. People often feel controlled when their rewards depend on a certain level of output or type of performance. For example, the piece-rate payment practice is a very controlling form of contingent payment. In such cases, as we said earlier, intrinsic motivation will decrease. However, in the Enzle and Ross study it was highlighted that rewards imply a certain skill level at the activity. They therefore structured the situation so that the informational aspect of the contingent reward was more salient; hence, intrinsic motivation increased. The same was true of the Karniol and Ross (1977) study previously mentioned. They used contingent rewards, and yet they paired them with a very informational blinking green light which signaled competence; and indeed the rewards (green light plus marshmallows) increased the children's intrinsic motivation.

Deci and Porac (1978) suggested that in organizations monetary bonuses are

likely to be perceived as informational, unlike the piece-rate payments, which tend to be perceived as controlling. Both are contingent rewards, but they are experienced quite differently. A study by Lopez (1979) supports their speculation. She found that good performance bonus prizes increased the intrinsic motivation of a telephone company's employees.

The question of expectancy can also be understood within the context of the relative salience of the two aspects of rewards. When rewards are expected they are likely to be experienced as more controlling (all other things equal) because the rewardee begins doing the activity in order to get the reward. With unexpected rewards, however, there is no appreciable control factor; they come along after the performance and are likely to be interpreted as an indication of good performance.

Finally, it should be clear that salience of a reward is not the parameter that will determine whether rewards will decrease intrinsic motivation. Rewards will need to be salient to have an effect, but salient rewards can either bolster or drain one's intrinsic motivation. The important parameter is the salience of the two aspects of the reward, not the salience of the reward per se.

C. FACTORS IN THE REWARDER

Finally, we suggest that characteristics of the rewarder are likely to influence how rewards are perceived. For example, a highly authoritarian person is likely to use rewards for purposes quite different from those of a less authoritarian person. The former person will tend to have a more controlling orientation toward the use of rewards and is likely to convey this orientation in some way, whether blatant or subtle. We assert that the use of rewards by different types of rewarders will have a different effect on intrinsic motivation, even when the same behaviors are being rewarded. We know of only one study that has investigated this general question: the study, by Deci, Nezlek, and Sheinman (in press, b) which supported the current reasoning, is presented in Section V.

V. Intrinsic Motivation and Perceived Competence in the Schools

In this section we shall describe a field study conducted in the fourth, fifth, and sixth grades of four elementary schools. The data and conclusions we present deal with two issues: whether teacher orientations affect the intrinsic motivation and perceived competence of their pupils, presumably as a result of their using rewards and other structures in a primarily controlling vs. informational fashion; and how patterns of intrinsic motivation and perceived competence differ between the sexes and among the grade levels studied.

A. THE IMPACT OF TEACHER CHARACTERISTICS

The study (Deci *et al.*, in press, b) was conducted in 35 classrooms and looked at the relation of teachers' orientation toward the use of rewards as they related to children's intrinsic motivation and perceived competence during one school year.

The basic design of the study was the administration of an intrinsic motivation measure and a perceived competence (i.e., self-esteem) measure to 610 children in late October and then again in May of one school year. In addition, teachers' attitudes toward control vs. autonomy were assessed and related to the children measures using correlational procedures. It was hypothesized that teachers who believe in dealing with children in a way that encourages them to be autonomous (i.e., who use rewards informationally) would tend to facilitate the intrinsic motivation and perceived competence of their pupils, whereas teachers who are more controlling will tend to discourage the intrinsic motivation and perceived competence of their pupils.

The two children measures were developed by Harter (1979, in press). The first measure assessed intrinsic motivation in the classroom. It has five subscales that Harter designed to reflect various dimensions of intrinsic motivation: (a) preference for vs. avoidance of challenge; (b) curiosity vs. preference for familiar material; (c) desire for independent mastery vs. dependence on teacher; (d) desire to work for one's own satisfaction vs. working for grades and teacher approval; and (e) internal vs. external criteria for success. The first three subscales have been shown to be primarily motivational, whereas the last two are primarily evaluative (Harter, 1979).

The second measure was a self-esteem measure defined in terms of children's perceptions of their own competence and self-determination (Harter, in press). This measure has four subscales, a general subscale plus a subscale reflecting perceived competence in three content domains—cognitive, social, and physical.

Further, each child also completed a classroom climate questionnaire developed by deCharms (1976) in which children described their classroom and teacher on intrinsic vs. extrinsic dimensions.

Finally, the researchers developed a measure to assess teachers' attitudes toward control vs. autonomy, reasoning that teachers who favor control will use rewards as sanctions, whereas those who favor autonomy will use rewards informationally. The control vs. autonomy categorization, although binary, really represents a continuum. Therefore, four types of orientations for teachers dealing with children were characterized. They ranged from being very controlling to being informational (supportive and encouraging of autonomous behavior).

The four "styles" used in the questionnaire were: a "hard-line" style in which teachers make decisions about what is right, require pupils to do this "right" thing, and use highly controlling sanctions to produce the behavior; a

"do-what-you-ought" style, which emphasizes shoulds and oughts and utilizes guilt to get the children to do what the teacher thinks they should do but which does not have the teacher "making" them do it in the more overt sense; a "compare-yourself-to-others" style in which teachers do not tell kids what they should do but rather encourage them to compare themselves with others so as to see where they stand relative to others on the behavior of concern; and finally, an "autonomous" style, in which teachers encourage children to consider the relevant elements of the situation and to take responsibility for working out a solution to the problem.

Teachers considered eight typical problem vignettes and responded in a way that reflected their preferences for ways of handling the problems. Their responses were combined algebraically to give an index that placed them along the control-autonomy continuum.

In the analysis the children were aggregated within each classroom on their intrinsic motivation, perceived competence, and classroom climate responses. Since the intrinsic motivation and perceived competence measures were administered twice, change scores for spring minus fall and also averages for the spring and fall values were created and correlated with the teacher measure. For the teachers, their total "attitude toward control-autonomy" scores were used. Finally, there was the "origin climate questionnaire," which children completed to describe their classrooms and teachers. This was administered once, in the winter, so these scores, aggregated within classrooms, were correlated both with the teacher measures and with the changes and averages on intrinsic motivation and perceived competence.

First, let us consider the correlations between the teacher measures and the children's change and average scores on intrinsic motivation and perceived competence. According to cognitive evaluation theory, there should be consistent correlations between the "attitude toward control-autonomy" measure and changes in intrinsic motivation. Presumably, those teachers who use rewards more informationally will have children who become more intrinsically motivated and feel more competent, whereas those who use them more controllingly will have children who tend to lose intrinsic motivation and felt competence. Alternatively, if this measure does not correlate with changes (assuming the changes are not large enough to yield a consistent effect), one would expect correlations between teacher measures and average scores on children's intrinsic motivation and perceived competence. The theoretical implications of one versus the other type of correlation will be discussed following presentation of the data.

The teachers' "attitude toward control-autonomy" measure correlated with fall to spring average scores on all three of the motivational subscales of the intrinsic-extrinsic scale, although it did not correlate with the evaluative subscales. Further, it correlated with the general perceived competence subscale and the cognitive subscale, it correlated marginally with the social subscale, and it

did not correlate with the physical subscale. There was a very strong relationship, therefore, of teachers' characteristics to children's intrinsic motivation and to classroom-relevant dimensions of perceived competence. The teacher measure, however, did not correlate with Fall to Spring change scores.

There was also a relationship between the teachers' "attitude toward control-autonomy" measure and the children's responses on the origin climate questionnaire (the total scores on each measure correlated significantly, with $r = .354$). The teacher measure correlated especially highly ($r = .511$) with the children measure subscale "facilitating acceptance of personal responsibility." Apparently one thing which is highly stressed by "autonomy"-oriented teachers is the importance of children's accepting responsibility for their own behavior.

In considering the relationship between the children's perceptions of their classroom and the intrinsic motivation and perceived competence of the children there was a stronger relationship between the classroom climate and the averages of the children's fall and spring scores than between the classroom climate and the changes from the children's fall to spring scores. There was a fairly consistent relationship between the children's perceptions of the origin (or intrinsic) nature of the classroom/teacher (deCharms, 1976) and their average intrinsic motivation, and there was a very strong and consistent relationship between their perceptions of the origin nature of the classroom/teacher and their feelings of competence in all domains. When children perceive their classroom/teacher as more intrinsically oriented, they have higher self-esteem, that is, they perceive themselves as being more competent, and they are more intrinsically motivated.

These results of the Deci *et al.* study complement the work of deCharms (1976). He and his colleagues found, in a large field experiment, that when they trained teachers to be more intrinsically oriented, their children became more intrinsically motivated and performed better on standardized achievement tests.

B. MOTIVATIONAL SUBSYSTEMS (ONCE AGAIN)

One of the things that stood out most clearly in the data was the fact that the "attitudes toward control-autonomy" measure related consistently and quite strongly to the averages of the children's fall and spring scores on intrinsic motivation and perceived competence. However, there was little relationship between teacher characteristics and change scores of the children over the course of the 7-month period. This was a striking effect which has interesting theoretical implications in line with some points made earlier in this review.

Deci *et al.* found strong and virtually identical relationships between the teachers' orientations and the children's measures in the fall, the spring, and the average of fall and spring. In short, the relationship between teachers' orientation and children's intrinsic motivation and self-esteem had become established in the first 6-8 weeks of the school year and remained constant over the next 7 months.

There is no indication that the relationship was caused by selection procedures or other extraneous factors; it appears that all grades were the same (save for random variation) at the beginning of the year. It seems quite clear that the results are not spurious. They are generally consistent with our theoretical orientation, and the possibility of getting this pattern of results by chance is essentially zero.

A "trait approach" to the understanding of intrinsic motivation does not seem to fit the data, for such a conceptualization would be more consistent with the prediction of an increase in relationship over the course of the year. The teachers' orientations would gradually impact the children's "trait," so one would expect a relationship between the teacher measure and the children's change scores. Instead, a conceptualization that does fit the data views the children as having an intrinsic orientation that is a subsystem of the human organism. A *motivational subsystem* (intrinsic or extrinsic) is defined as a set of beliefs about self and others, programs for interacting with the environment, and affective experiences all of which are organized by motivational processes. A subsystem is ever present for the individual, although it would be more or less operative from person to person and for each person from time to time. Intrinsic motivation is the heart of the intrinsic motivational subsystem and would be the primary motivational force operating when the intrinsic subsystem is centrally salient for the person. With the motivation comes corresponding beliefs and attitudes. Children who were more intrinsic also had more positive self-concepts; they perceived themselves to be more competent. Each person also is conceptualized as having an extrinsic motivational subsystem, which is more oriented toward rewards, is more concerned with control, is less supportive and less concerned with autonomy, involves a lower self-esteem, and so on.

What this conceptualization suggests in terms of the current data is that within the first couple of months of school the children have "adapted" to the teacher. Those who are with teachers who are oriented toward intrinsic motivation, autonomy, and the use of rewards as information rather than control will adapt to the situation by operating more out of their intrinsic subsystem. Once this adaptation is made, which for elementary school children seems to occur fairly quickly, it tends to be stable as long as the situation remains constant.

It is probable that as one versus the other human motivational subsystem (intrinsic versus extrinsic) is used more, it will become a more dominant aspect of the personality and will have a greater influence on the person's general interactions with the physical and social environment.

In terms of cognitive evaluation theory, this theoretical point of view suggests that, at the motivational level, the "undermining of intrinsic motivation" involves an engagement of the extrinsic subsystem as the dominant motivational orientation in relation to certain behaviors and the concomitant disengagement of the intrinsic subsystem with those behaviors. The cognitive aspect of this shift in subsystems is the "change in perceived locus of causality."

C. DESCRIPTIVE INFORMATION ON SCHOOL CHILDREN

On all five intrinsic motivation subscales as well as the total intrinsic score, spring scores were more intrinsic than fall scores. On average, children came to see themselves as more intrinsic over the 7-month period. Boys were more intrinsically motivated than girls on two subscales and the total scale, whereas there was no scale on which girls were more intrinsic than boys. On three of the intrinsic motivation subscales plus the total score, there were grade differences. Sixth graders were more intrinsic than fifth graders, who were in turn more intrinsic than fourth graders. This was more so for males than females, although it was true for both sexes. The greater intrinsic orientation was indicated by the acquisition of greater independence of judgment and evaluation, although this was accompanied by some loss of curiosity.

On the perceived competence scale, there was not a clear increase over the course of the 7-month period. Only the general subscale tended to be higher. There were, however, quite clear sex effects. On the social, physical, and general subscales, boys perceived themselves as more competent than girls. Only on the cognitive subscale did boys and girls perceive themselves as equally competent. On two of the four subscales, there were differences between grades. On the cognitive and general subscales, fifth graders perceived themselves as more competent than either fourth or sixth graders.

In sum, boys tend to have higher self-esteem (or perceived competence) than girls during these grades, and fifth graders tend to have a higher self-esteem than fourth or sixth. Perhaps there is a peak at the fifth grade where children feel good about themselves after several years in school and before the time in sixth grade when they begin to fear going into new school settings at the junior high level.

Analyses were also done on the sex of the teacher to determine whether male vs. female teachers tended to affect children's intrinsic motivation and perceived competence differently. In general the answer was no. On the six intrinsic motivation scales and the four perceived competence scales there was only one difference that was conventionally significant. On the general subscale of the perceived competence measure, female teachers had children with greater felt competence than male teachers. Thus, there is little evidence of meaningful difference between male and female teachers in terms of their impact on the intrinsic motivation and perceived competence of children.

VI. A Final Statement

The research literature that has explored the nature of intrinsic motivation and the effects of rewards and controls on intrinsic motivation appears to have

been highly supportive of the competence and self-determination formulation of intrinsic motivation and also of the propositions of cognitive evaluation theory (Deci, 1975). The results of individual studies have provided the basis for greater understanding of the phenomena and greater specificity of the theory. One conclusion to be reached from this is that, in general, an understanding of motivational processes is critical for explicating and predicting human behavior as well as a variety of interrelated beliefs, attitudes, and affects, the complex of which we have referred to as motivational subsystems. It seems probable that continued investigation will further illuminate these phenomena and processes.

REFERENCES

- Alegre, C., & Murray, E. J. Locus of control, behavioral intention, and verbal conditioning. *Journal of Personality*, 1974, 42, 668-681.
- Amabile, T. M. Effects of external evaluation on artistic creativity. *Journal of Personality and Social Psychology*, 1979, 37, 221-233.
- Amabile, T. M., DeJong, W., & Lepper, M. R. Effects of externally imposed deadlines on subsequent intrinsic motivation. *Journal of Personality and Social Psychology*, 1976, 34, 92-98.
- Anderson, R., Manoogian, S. T., & Reznick, J. S. The undermining and enhancing of intrinsic motivation in preschool children. *Journal of Personality and Social Psychology*, 1976, 34, 915-922.
- Arkes, H. R. Competence and the maintenance of behavior. *Motivation and Emotion*, 1978, 2, 201-211.
- Arnold, H. J. Effects of performance feedback and extrinsic reward upon high intrinsic motivation. *Organizational Behavior and Human Performance*, 1976, 17, 275-288.
- Atkinson, J. W. *An introduction to motivation*. Princeton, N.J.: Van Nostrand, 1964.
- Bandura, A. *Social learning theory*. Englewood Cliffs, N.J.: Prentice-Hall, 1977.
- Baron, R. M., & Ganz, R. L. Effects of locus of control and type of feedback on the task performance of lower-class, black children. *Journal of Personality and Social Psychology*, 1972, 21, 124-130.
- Bem, D. J. Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology*. Vol. 6. New York: Academic Press, 1972. Pp. 1-62.
- Benware, C., & Deci, E. L. Attitude change as a function of the inducement for espousing a pro-attitudinal communication. *Journal of Experimental Social Psychology*, 1975, 11, 271-278.
- Berkowitz, L. *Aggression: A social psychological analysis*. New York: McGraw-Hill, 1962.
- Berlyne, D. E. Exploration and curiosity. *Science*, 1966, 153, 25-33.
- Berlyne, D. E. Curiosity and learning. *Motivation and Emotion*, 1978, 2, 97-175.
- Bialer, I. Conceptualization of success and failure in mentally retarded and normal children. *Journal of Personality*, 1961, 29, 303-320.
- Blanck, P., Jackson, L., & Reis, H. T. Effects of verbal praise on intrinsic motivation for sex-typed tasks. Paper presented at the meeting of the American Psychological Association, New York, September, 1979.
- Boggiano, A. K., & Ruble, D. N. Competence and the overjustification effect: A developmental study. *Journal of Personality and Social Psychology*, 1979, 37, 1462-1468.
- Butler, R. A. Discrimination learning by rhesus monkeys to visual exploration motivation. *Journal of Comparative and Physiological Psychology*, 1953, 46, 95-98.
- Calder, B. J., & Staw, B. M. The interaction of intrinsic and extrinsic motivation: Some methodological notes. *Journal of Personality and Social Psychology*, 1975, 31, 76-80. (a)
- Calder, B. J., & Staw, B. M. Self-perception of intrinsic and extrinsic motivation. *Journal of Personality and Social Psychology*, 1975, 31, 599-605. (b)
- Carone, D. P. The effects of positive verbal feedback on female intrinsic motivation. Unpublished master's thesis, University of Bridgeport, 1975.
- Condry, J. C. Enemies of exploration: Self-initiated versus other-initiated learning. *Journal of Personality and Social Psychology*, 1977, 35, 459-477.
- Csikszentmihalyi, M. *Beyond boredom and anxiety*. San Francisco: Jossey-Bass, 1975.
- deCharms, R. *Personal causation: The internal affective determinants of behavior*. New York: Academic Press, 1968.
- deCharms, R. *Enhancing motivation: Change in the classroom*. New York: Irvington, 1976.
- Deci, E. L. Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, 1971, 18, 105-115.
- Deci, E. L. Effects of contingent and non-contingent rewards and controls on intrinsic motivation. *Organizational Behavior and Human Performance*, 1972, 8, 217-229. (a)
- Deci, E. L. Intrinsic motivation, extrinsic reinforcement and inequity. *Journal of Personality and Social Psychology*, 1972, 22, 113-120. (b)
- Deci, E. L. *Intrinsic motivation*. New York: Plenum, 1975.
- Deci, E. L. Notes on the theory and meta-theory of intrinsic motivation. *Organizational Behavior and Human Performance*, 1976, 15, 130-145.
- Deci, E. L. *The psychology of self-determination*. Lexington, Mass.: D.C. Heath, Lexington Books, 1980.
- Deci, E. L., Benware, C., & Landy, D. A. The attribution of motivation as a function of output and rewards. *Journal of Personality*, 1974, 42, 652-667.
- Deci, E. L., Betley, G., Kahle, J., Abrams, L., & Porac, J. When trying to win: Competition and intrinsic motivation. *Personality and Social Psychology Bulletin*, in press. (a)
- Deci, E. L., & Cascio, W. F. Changes in intrinsic motivation as a function of negative feedback and threats. Paper presented at the meeting of the Eastern Psychological Association, Boston, April, 1972.
- Deci, E. L., Cascio, W. F., & Krusell, J. Sex differences, positive feedback and intrinsic motivation. Paper presented at the meeting of the Eastern Psychological Association, Washington, D.C., May, 1973.
- Deci, E. L., Cascio, W. F., & Krusell, J. Cognitive evaluation theory and some comments on the Calder, Staw critique. *Journal of Personality and Social Psychology*, 1975, 31, 81-85.
- Deci, E. L., Nezlek, J., & Sheinman, L. Characteristics of the rewarder and intrinsic motivation of the rewarder. *Journal of Personality and Social Psychology*, in press. (b)
- Deci, E. L., & Porac, J. F. Cognitive evaluation theory and the study of human motivation. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward*. Hillsdale, N.J.: Erlbaum, 1978. Pp. 149-176.
- Deci, E. L., Porac, J., & Shapira, Z. Effects of rewards on interest and intrinsic motivation for an extrinsic activity. Unpublished manuscript, University of Rochester, 1978.
- Dember, W. N., & Earl, R. W. Analysis of exploratory, manipulatory, and curiosity behaviors. *Psychological Review*, 1957, 64, 91-96.
- Deutsch, M. Cooperation and trust: Some theoretical notes. In M. R. Jones (Ed.), *Nebraska Symposium on Motivation*. Vol. 10. Lincoln: University of Nebraska Press, 1962. Pp. 275-319.
- Deutsch, M. Socially relevant science: Reflections on some studies of interpersonal conflict. *American Psychologist*, 1969, 24, 1076-1092.
- Dienstbier, R. A., & Leak, G. K. Effects of monetary reward on maintenance of weight loss: An extension of the overjustification effect. Paper presented at the meeting of the American Psychological Association, Washington, D.C., September, 1976.

- Dollinger, S. J., & Thelen, M. H. Overjustification and children's intrinsic motivation: Comparative effects of four rewards. *Journal of Personality and Social Psychology*, 1978, **36**, 1259-1269.
- Enzle, M. A., & Ross, J. M. Increasing and decreasing intrinsic interest with contingent rewards: A test of cognitive evaluation theory. *Journal of Experimental Social Psychology*, 1978, **14**, 588-597.
- Farr, J. L. Task characteristics, reward contingency, and intrinsic motivation. *Organizational Behavior and Human Performance*, 1976, **16**, 294-307.
- Farr, J. L., Vance, R. J., & McIntyre, R. M. Further examination of the relationship between reward contingency and intrinsic motivation. *Organizational Behavior and Human Performance*, 1977, **20**, 31-53.
- Finch, B. D., & Mahoney, M. J. Reinforcement effects on intrinsic interest: Undermining the overjustification hypothesis. *Behavior Therapy*, 1975, **6**, 367-377.
- Fisher, C. D. The effects of personal control, competence, and extrinsic reward systems on intrinsic motivation. *Organizational Behavior and Human Performance*, 1978, **21**, 273-288.
- Freud, S. *A general introduction to psycho-analysis*. New York: Perma-Giants, 1949. (Originally published, 1917.)
- Garbarino, J. The impact of anticipated reward upon cross-aged tutoring. *Journal of Personality and Social Psychology*, 1975, **32**, 421-428.
- Greene, D., & Lepper, M. R. Effects of extrinsic rewards on children's subsequent intrinsic interest. *Child Development*, 1974, **45**, 1141-1145.
- Greene, D., Sternberg, B., & Lepper, M. R. Overjustification in a token economy. *Journal of Personality and Social Psychology*, 1976, **34**, 1219-1234.
- Hamner, W. C., & Foster, L. W. Are intrinsic and extrinsic rewards additive: A test of Deci's cognitive evaluation theory of task motivation. *Organizational Behavior and Human Performance*, 1975, **14**, 398-415.
- Harackiewicz, J. M. The effects of reward contingency and performance feedback on intrinsic motivation. *Journal of Personality and Social Psychology*, 1979, **37**, 1352-1363.
- Harter, S. Effectance motivation reconsidered: Toward a developmental model. *Human Development*, 1978, **21**, 34-64.
- Harter, S. A new self-report scale of intrinsic versus extrinsic motivation in the classroom: Motivational and informational components. Society for Research in Child Development, 1979.
- Harter, S. Perceived competence scale for children. *Child Development*, in press.
- Hartmann, H. *Ego psychology and the problem of adaptation*. New York: International Universities Press, 1958.
- Heider, F. *The psychology of interpersonal relations*. New York: Wiley, 1958.
- Hull, C. L. *Principles of behavior*. New York: Appleton, 1943.
- Hunt, J. McV. Intrinsic motivation and its role in psychological development. In D. Levine (Ed.), *Nebraska Symposium on Motivation*. Vol. 13. Lincoln: University of Nebraska Press, 1965. Pp. 189-282.
- Karniol, R., & Ross, M. The effect of performance-relevant and performance-irrelevant rewards on children's intrinsic motivation. *Child Development*, 1977, **48**, 482-487.
- Kelley, H. H., & Thibaut, J. W. Group problem solving. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology*. (2nd ed.) Vol. 4. Reading, Mass.: Addison-Wesley, 1969. Pp. 1-101.
- Kruglanski, A. W. The endogenous-exogenous partition in attribution theory. *Psychological Review*, 1975, **82**, 387-406.
- Kruglanski, A. W., Alon, S., & Lewis, T. Retrospective misattribution and task enjoyment. *Journal of Experimental Social Psychology*, 1972, **8**, 493-501.
- Kruglanski, A. W., Freedman, I., & Zeevi, G. The effects of extrinsic incentives on some qualitative aspects of task performance. *Journal of Personality*, 1971, **39**, 606-617.

- Kruglanski, A. W., Riter, A., Amitai, A., Margolin, B., Shabtai, L., & Zaksh, D. Can money enhance intrinsic motivation?: A test of the content-consequence hypothesis. *Journal of Personality and Social Psychology*, 1975, **31**, 744-750.
- Lee, D. Y., Syrnok, R., & Hallschmid, C. Self-perception of intrinsic and extrinsic motivation: Effects on institutionalized mentally retarded adolescents. *American Journal of Mental Deficiency*, 1977, **81**, 331-337.
- Lefcourt, H. M. The function of the illusion of control. *American Psychologist*, 1973, **28**, 417-425.
- Lepper, M. R., & Greene, D. Turning play into work: Effects of adult surveillance and extrinsic rewards on children's intrinsic motivation. *Journal of Personality and Social Psychology*, 1975, **31**, 479-486.
- Lepper, M. R., & Greene, D. On understanding "overjustification": A reply to Reiss and Sushinsky. *Journal of Personality and Social Psychology*, 1976, **33**, 25-35.
- Lepper, M. R., & Greene, D. (Eds.) *The hidden costs of reward*. Hillsdale, N.J.: Erlbaum, 1978. (a)
- Lepper, M. R., & Greene, D. Overjustification research and beyond. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward*. Hillsdale, N.J.: Erlbaum, 1978. (b)
- Lepper, M. R., Greene, D., & Nisbett, R. E. Undermining children's intrinsic interest with extrinsic rewards: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology*, 1973, **28**, 129-137.
- Levine, F. M., & Fasnacht, G. Token rewards may lead to token learning. *American Psychologist*, 1974, **29**, 816-820.
- Lonky, E. I. The effects of extrinsic rewards and praise on intrinsic motivation: A cognitive-developmental perspective. Unpublished doctoral dissertation, University of Wisconsin-Madison, 1978.
- Lopez, E. M. A field study of the effect of contingent reward on intrinsic motivation. Unpublished manuscript, St. John's University, 1979.
- Margolis, R. B., & Mynatt, C. R. The effects of self and externally administered reward on high base rate behavior. Unpublished manuscript, Bowling Green State University, 1979.
- Martin, J. A. Effects of positive and negative adult-child interactions on children's task performance and task preferences. *Journal of Experimental Child Psychology*, 1977, **23**, 493-502.
- Maslow, A. H. *Motivation and personality*. New York: Harper, 1954.
- Mawhinney, T. C. Intrinsic X extrinsic motivation: Perspectives from behaviorism. *Organizational Behavior and Human Performance*, 1979, **24**, 411-440.
- McClelland, D. C., Atkinson, J. W., Clark, R. W., & Lowell, E. L. *The achievement motive*. New York: Appleton, 1953.
- McGraw, K. D. The detrimental effect of reward on performance: A literature review and a prediction model. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward*. Hillsdale, N.J.: Erlbaum, 1978. Pp. 33-60.
- McGraw, K. D., & McCullers, J. C. Evidence of a detrimental effect of extrinsic incentives on breaking a mental set. *Journal of Experimental Social Psychology*, 1979, **15**, 285-294.
- Nentwig, C. G. Attribution of cause and long term effects of the modification of smoking behavior. *Behavior Analysis and Modification*, 1978, **2**, 285-295.
- Notz, W. W. Work motivation and the negative effects of extrinsic rewards: A review with implications for theory and practice. *American Psychologist*, 1975, **30**, 884-891.
- Piaget, J. *The origin of intelligence in children*. New York: International Universities Press, 1952.
- Pinder, C. C. Additivity versus nonadditivity of intrinsic and extrinsic incentives: Implications for work motivation, performance, and attitudes. *Journal of Applied Psychology*, 1976, **61**, 693-700.
- Pittman, T. S., Davey, M. E., Alafat, K. A., Wetherill, K. V., & Wirsul, N. A. Informational vs. controlling rewards, levels of surveillance and intrinsic motivation. *Personality and Social Psychology Bulletin*, in press.

- Pritchard, R. D., Campbell, K. M., & Campbell, D. J. Effects of extrinsic financial rewards on intrinsic motivation. *Journal of Applied Psychology*, 1977, **62**, 9-15.
- Reiss, S., & Sushinsky, L. W. Overjustification, competing responses, and the acquisition of intrinsic interest. *Journal of Personality and Social Psychology*, 1975, **31**, 1116-1125.
- Rosenfield, D., Folger, R., & Adelman, H. F. When rewards reflect competence: A qualification of the overjustification effect. *Journal of Personality and Social Psychology*, in press.
- Ross, M. Salience of reward and intrinsic motivation. *Journal of Personality and Social Psychology*, 1975, **32**, 245-254.
- Ross, M. The self-perception of intrinsic motivation. In J. H. Harvey, W. J. Ickes, & R. F. Kidd (Eds.), *New directions in attribution research*. Vol. 1. Hillsdale, N.J.: Erlbaum, 1976.
- Ryan, R. M., & Deci, E. L. The importance of intrinsic motivation for maintenance and transfer of treatment gains in psychotherapy. Unpublished manuscript, University of Rochester, 1980.
- Scott, W. E., Jr. The effects of extrinsic rewards on "intrinsic motivation": A critique. *Organizational Behavior and Human Performance*, 1976, **15**, 117-129.
- Seligman, M. E. P. *Helplessness: On depression, development and death*. San Francisco: Freeman, 1975.
- Smith, R. W., & Pittman, T. S. Reward, distraction and the overjustification effect. *Journal of Personality and Social Psychology*, 1978, **36**, 565-572.
- Smith, T. S., & Murphy, R. J. Conflicting criteria of success in the careers of symphony musicians. Unpublished manuscript, University of Rochester, Department of Sociology, 1978.
- Smith, W. E. The effects of social and monetary rewards on intrinsic motivation. Unpublished doctoral dissertation, Cornell University, 1974.
- Swann, W. B., & Pittman, T. S. Initiating play activity of children: The moderating influence of verbal cues on intrinsic motivation. *Child Development*, 1977, **48**, 1128-1132.
- Walker, E. L. Psychological complexity and preference: A hedgehog theory of behavior. In D. E. Berlyne, & K. B. Madsen (Eds.), *Pleasure, reward, and preference*. New York: Academic Press, 1973. Pp. 65-97.
- Weiner, M. J., & Mander, A. M. The effects of reward and perception of competency upon intrinsic motivation. *Motivation and Emotion*, 1978, **2**, 67-73.
- White, R. W. Motivation reconsidered: The concept of competence. *Psychological Review*, 1959, **66**, 297-333.
- White, R. W. *Ego and reality in psychoanalytic theory*. (Psychological Issues, Monogr. 11.) New York: International Universities Press, 1963.
- Zuckerman, M., Porac, J., Lathin, D., Smith, R., & Deci, E. L. On the importance of self-determination for intrinsically motivated behavior. *Personality and Social Psychology Bulletin*, 1978, **4**, 443-446.