

## Social Influences on Creativity: The Effects of Contracted-for Reward

Teresa M. Amabile, Beth Ann Hennessey, and Barbara S. Grossman  
Brandeis University

Three studies were conducted to examine the effects of reward on children's and adults' creativity. The primary hypothesis was that explicitly contracting to do an activity in order to receive a reward will have negative effects on creativity, but receiving no reward or only a noncontracted-for reward will have no such negative effects. All three studies provided support for this hypothesis. Moreover, this support appears to be strong and generalizable across different subject populations, reward types, reward presentations, and creativity tasks. Possible mechanisms for the phenomenon are discussed.

I believe you have never written to order, by the yard, and have never experienced that hellish torture.—Dostoevsky, in a letter to a friend (Allen, 1948)

The torture that Dostoevsky described consisted not of some insidious political controls on his writing, but of something that might, on the face of it, seem quite positive. He had been commissioned to write a novel by a Russian publisher and had been paid a fairly large fee in advance. Furthermore, he had not been given strict guidelines on what he was to write; he was simply expected to produce something wonderful in exchange for the money. In writing these despairing words, Dostoevsky illustrates one of the most intriguing aspects of creative work. It seems that, unlike most desirable behaviors that psychologists study, creative behavior cannot be achieved simply by trying. Even people who have previously distinguished themselves for outstanding creativity often fail to produce creative work despite their best efforts. Indeed, some—for example, writers suffering from writer's block, as Dostoevsky did—complain that the harder they try, the more meager their success. These difficulties seem to arise when people attempt to meet the demands of others—when, in other words, they try for the wrong reasons.

One wrong reason might be to work for a reward offered by others. The use of reward has been the focus of heated controversy in psychology over the past two decades. According to the classical Skinnerian position (e.g., Skinner, 1938), reinforcement is the

heart of behavioral control. If desired behaviors (or successive approximations to them) are rewarded, the likelihood of those behaviors will increase. Beginning around 1970, researchers began to question seriously the assumption that reward will always enhance (or will at least maintain) all behaviors. Intrinsic motivation theorists suggested that reward can undermine certain aspects of behavior under some conditions (e.g., DeCharms, 1968; Deci, 1971; Lepper, Greene, & Nisbett, 1973; McGraw, 1978). Several studies have demonstrated the overjustification effect: Offering a reward for an enjoyable behavior can decrease the likelihood that the behavior will be performed under subsequent nonrewarded conditions (e.g., Deci, 1971; Lepper et al., 1973). Although conclusions drawn from these studies have been challenged by reinforcement theorists (e.g., Feingold & Mahoney, 1975; Reiss & Sushinsky, 1975), the phenomenon of decreased intrinsic motivation following expected external reward has been empirically well-documented.

According to self-perception theory (Bem, 1972), subjects in the overjustification studies do not begin with a clear and salient awareness of their intrinsic interest in the task. Because of this uncertainty, subjects who perform the task in order to meet some extrinsic contingency infer that their task engagement was motivated only by the constraint, and not by their own interest. In other words, these subjects come to see themselves as extrinsically motivated. This attribution theory explanation suggests that subjects make use of the discounting principle applied to the schema for "multiple sufficient causes" (Kelley, 1973). That is, they discount one possible cause of a behavior when another, more salient or plausible cause is present. In the case of the overjustification studies, the external constraint is taken to be a more salient and plausible cause than the subject's own interest in the task. Similarly, cognitive evaluation theory (Deci, 1975; Deci & Ryan, 1980) proposes that the presence of salient external constraints on performance causes a shift in the individual's perceived locus of causality from internal to external.

In all of these explanations, a means-end relation between task and constraint is required for the undermining of intrinsic interest. That is, subjects must perceive their task engagement primarily as a means to achieving the extrinsic end. In the case of reward, then, the reward must be seen as task-contingent; achievement of the reward must be contingent on doing the task. A great deal of research has, in fact, demonstrated that task-

---

The research reported here was supported by a grant from the National Institute of Child Health and Human Development ("Development and Maintenance of Creativity in Children"), by a grant from the Foundation for Child Development ("Effects of Socially Imposed Constraints on Affect and Creativity in Children"), and by a grant from the Biomedical Research Support Grant Program, Division of Research Resources, National Institutes of Health (BRSG S07 RR07044), all awarded to Teresa M. Amabile.

We wish to thank the principals, teachers, and students of St. Jude School in Waltham, Massachusetts, and St. Clement School in Somerville, Massachusetts, for their integral role in Studies 1 and 2. We also wish to thank Donna L. Capotosto for her valuable assistance in conducting Study 3.

Correspondence concerning this article should be addressed to Teresa M. Amabile, Department of Psychology, Brandeis University, Waltham, Massachusetts 02254.

contingent rewards do undermine intrinsic motivation, but noncontingent rewards do not—whether those noncontingent rewards are presented as unexpected surprises after task completion or as bonuses for which subjects do not explicitly contract (cf. Ryan, Mims, & Koestner, 1983).

One way in which children—and, for that matter, adults—might come to view task engagement as a means to an end is by considering the task work rather than play. This possibility, suggested by Lepper and Greene (1978) as well as other theorists (e.g., McGraw, 1978; Morgan, 1981), follows the notion of socially learned scripts about events. According to this explanation, subjects react negatively to a task as work when their behavior is controlled (or appears to be controlled) by socially imposed factors, because they have learned that work is usually something that someone must be induced to do. On the other hand, they might react positively to the same task as play when they perceive no salient external constraints on task engagement.

Thus, there are at least three ways in which intrinsic motivation might be changed to extrinsic motivation: (a) a salient reward can be offered for engaging in the intrinsically interesting task, leading to perceptions that task engagement is simply a means to the end of obtaining the reward; (b) the task can be made to appear as a means to an end in some other way than the offer of reward; or (c) the task can be directly presented as work rather than play. Though the third possibility has received little research attention, there is, as we have seen, abundant evidence of the first two—by the offer of reward for task engagement, or the imposition of some other salient extrinsic constraint, subsequent intrinsic motivation to perform a task can be undermined.<sup>1</sup>

Extrinsic constraints can also affect aspects of immediate task performance, in addition to undermining subsequent interest in performing the task. For example, the presence of constraints can lead to task attitudes that are more businesslike than playful. In one study, Garbarino (1975) had 5th- and 6th-grade girls act as tutors to 1st- and 2nd-grade girls. The older children were asked to teach a matching task to the younger children in a single experimental session. The tutors were either promised a reward (a free movie ticket) if the younger child learned well or were told nothing about a reward. The dependent variables included a rich array of qualitative performance dimensions: the tutors' use of evaluation, hints, and demands; the learners' performance; the emotional tone of the interactions, including the instances of laughter between the children during the session; and the efficiency of the tutoring (learning per unit time). Overall, the rewarded tutors held sessions that were high-pressured and businesslike, and the nonrewarded tutors held sessions that were relaxed yet highly efficient. In other words, the nonrewarded tutors seemed to be less inhibited—more prone to risk-taking and playful combination of ideas.

Creativity appears to result from just that sort of risk-taking, uninhibited exploration, and playful combination of old elements into new patterns (cf. Amabile, 1983a; Barron, 1968; Campbell, 1960; Crutchfield, 1962; Dansky & Silverman, 1975; Koestler, 1964; Lieberman, 1965; McGraw, 1978; Stein, 1974, 1975; Torrance, 1962). In other words, creativity can be viewed as a qualitative aspect of performance that is similar to those aspects studied by Garbarino (a generally playful vs. businesslike approach to a task). Based on these notions, the intrinsic motivation hypothesis of creativity proposes that intrinsic motivation is

conducive to creativity, whereas extrinsic motivation is detrimental (Amabile, 1983a, 1983b). Conceptually, this hypothesis follows McGraw's (1978) proposition that extrinsic motivation enhances performance on algorithmic tasks (simple, straightforward tasks), but undermines performance on heuristic tasks (open-ended, complex tasks where some search is required). Because creativity tasks are, by definition, heuristic, they should show adverse performance effects of extrinsic motivation. A number of experimental studies have, in fact, demonstrated negative effects of extrinsic constraints on creativity. The constraints studied have included expected evaluation (Amabile, 1979; Amabile, Goldfarb, & Brackfield, 1983), surveillance (Amabile et al., 1983), competition (Amabile, 1982b), restriction of choice (Amabile & Gitomer, 1984), and directly induced extrinsic motivational orientation (Amabile, 1985).

There are, however, few studies directly examining the impact of rewards on creativity. In some reward studies, subjects have been given tasks that can be considered similar to creative activities, such as doing artwork. As a result, qualitative performance measures in these studies can provide some clues about the impact of reward on creativity. For example, a number of researchers have asked children to draw pictures under rewarded or nonrewarded conditions (e.g., Greene & Lepper, 1974; Lepper et al., 1973; Loveland & Olley, 1979). These studies have found that for children who initially display a high level of interest in drawing, working for expected reward decreases subsequent interest. This decrement in interest can persist for several days beyond the initial rewarded drawing session. Furthermore, the globally assessed quality of these children's drawings is lower than that of nonrewarded children.

Some investigators have included rewards as one of several variables in their studies of the lives and works of outstandingly creative individuals. In a massive archival study, Simonton (1977) examined the relation between creative productivity at various points in the lives of 10 classical composers and the social reinforcements they received during those periods (such as honorary degrees or other prizes). The two variables were not significantly related. By contrast, in a study of Nobel laureates in science, Zuckerman (1967) found that productivity declined by a third after receipt of the award—much greater than the decline in a control group of scientists.

Neither of these studies, though, is ideal for a test of the intrinsic motivation hypothesis of creativity. Both focused on individuals who undoubtedly had extraordinarily high levels of baseline intrinsic interest in their fields, interest that might have been relatively invulnerable to undermining influences. Moreover, both studies are correlational, assessing complex global variables. In addition, Simonton's study examined relatively long-term relations between variables, and Zuckerman's results could easily be explained by the increased extraneous demands on one's time following the Nobel prize.

<sup>1</sup> Tang and Baumeister (1984) did examine the effects of labeling a task as *work* or *play* on adults' intrinsic motivation. They found that with adults who opposed the work ethic, labeling a task as *work* rather than *leisure* undermined intrinsic motivation. The effect was reversed for adults who supported the work ethic. Because our work-play labeling study was done with young children, the Tang and Baumeister study is not directly relevant.

To the extent that set-breaking can be considered a component of creative thinking, a few studies of set-breaking provide some direct experimental evidence of the effect of reward on creative performance. For example, Glucksberg (1962) gave subjects Duncker's (1945) candle problem. This task requires subjects to mount a candle on a vertical screen, using only the screen, the candle, a book of matches, and a box of thumbtacks. Solution of the problem requires subjects to "break set" by seeing that the thumbtack box can be used not only as a container but also as a platform for the candle. Subjects in the reward condition were told that they could win \$5 if their solution time was in the top 25% and \$20 if it was the single fastest solution time.<sup>2</sup> Nonreward subjects, who received no such instructions, solved the problem significantly faster. In two conceptual replications using different set-breaking problems (Glucksberg, 1964; McGraw & McCullers, 1979), the results were essentially the same. One of these two studies (McGraw & McCullers, 1979) included an intrinsic interest measure as well as a set-breaking measure. Interestingly, there were no differences between rewarded and nonrewarded subjects in their expressed interest in the set-breaking task. This latter finding is actually not unusual; it has often been found that performance-contingent rewards do not undermine task interest as much as task-contingent rewards do (e.g., Rosenfield, Folger, & Adelman, 1980; Ryan et al., 1983).

Kruglanski and his colleagues found effects for both creative performance and expressed interest (Kruglanski, Friedman, & Zeevi, 1971). On two open-ended creativity tasks, subjects promised a reward for participation (a task-contingent reward) performed significantly less well than nonrewarded subjects. In addition, there were nearly significant differences between the two groups on two intrinsic interest measures: Subjects' expressed enjoyment of the activities and their willingness to volunteer for further participation.

Thus, there is some evidence to suggest that reward might be detrimental to creativity. In general, subjects offered rewards differ from subjects not offered rewards in their approach to open-ended tasks. Rewarded subjects approach their tasks with less enjoyment; they focus more narrowly on the attainment of the extrinsic goal; they sometimes express less interest in the task; they have more difficulty breaking set; and they may even produce work that is subjectively rated as less creative.

We conducted three studies to closely examine the effects of reward on children's and adults' creativity. Specifically, we attempted not only to demonstrate the hypothesized negative effects of reward on creativity, but also to investigate the proposed explanations that (a) directly labeling a task as *work* might lead to the same negative effects as offered reward and (b) offering the reward as the end for which the task is merely a means (task-contingent reward) should lead to the hypothesized negative effects on creativity, but presenting the reward as simply a part of the experimental procedure (a "bonus" reward) should have no such negative effects. In the first study, offered-reward and task-label were crossed in an experiment where children performed three different types of creativity tasks.

### Study 1

Half of the children in this study made an explicit contract with the experimenter; they were asked (and all agreed) to promise

to do three creativity activities in order to earn the privilege of taking pictures with an instant camera. The rest of the children were simply presented with the picture-taking as one of several experimental activities. In addition, the experimenter referred to the creativity tasks as either work or play, or she used no such label. Thus, we used a  $2 \times 3$  factorial design (No Reward vs. Contracted-for Reward  $\times$  Work Label vs. Play Label vs. No Label).

### Method

#### Subjects

Subjects were 115 boys and girls ranging in age from 5 to 10 years. All children attended a parochial school in eastern Massachusetts. Parental consent was obtained, and in addition, all children were given the choice of whether or not to participate in the study. Subjects were randomly assigned in equal numbers to one of the six conditions. Preliminary sessions were conducted by 1 female experimenter, and the main experimental sessions were conducted by another.

#### Procedure

*Preliminary session.* Several days before the creativity testing session, the children who participated in this study were given Harter's (1981) Scale of Intrinsic vs. Extrinsic Motivational Orientation in the Classroom. This test, administered to the children in groups by a female experimenter, was given so that we might later assess possible relations between enduring motivational orientation and creativity on our tasks.

*Creativity tasks.* During the course of the main experimental session, the children performed three tasks. In order to assess appropriately the effects of reward and task label on creativity, it was necessary that these activities not depend on special skills that would increase the probability of large individual differences in baseline performance. In other words, every effort was made to choose tasks that minimize variability in performance due to individual differences in skill, because this factor could mask experimental effects in studies of social and environmental influences on creativity (cf. Amabile, 1982a).

The first of the three tasks, a test of artistic creativity, did not depend heavily on drawing ability or technical skill. Children were asked simply to make a design that "made them feel silly" using cardboard, glue, and an array of colored paper pieces.

The second task, a test of verbal creativity, did not depend heavily on verbal fluency. Here, children were asked to make up a brief story to accompany a fairly open-ended set of pictures in a book with no words. After looking through the illustrations once, subjects went through the book a second time saying "one thing" about each page. During this task only, the experimenter sat with the child for the purpose of turning pages and operating a tape recorder. No comments or other attempts at interaction were made.

Finally, the third task, a problem-solving test of creativity, did not depend heavily on mathematical or mechanical skills. Instead, the children were presented with some outlines of large irregular shapes and were instructed to fill in these figures in as many different ways as they could by using smaller felt triangles, squares, and rectangles.

*Main session.* Both the reward and labeling variables were implemented by a second female experimenter during the main experimental

<sup>2</sup> Such competitively contingent rewards have typically been found to undermine intrinsic motivation.

session. All children participated individually in these sessions. In all conditions, the children first took two photographs of a variety of interesting objects with an instant camera. (Or, if they preferred, they could choose to have pictures taken of themselves dressed in funny hats and costumes.) For children assigned to the nonreward conditions, this activity was given the same emphasis as the creativity tasks that followed. The experimenter explained that she had four things for the children to do: take pictures, make a collage, solve a puzzle, and tell a story. In other words, for nonrewarded children, the picture-taking was presented not as a reward, but simply as another activity for them to do. Children in the reward conditions, on the other hand, were told that they would be allowed to use the camera as a reward only if they agreed to later do the other three activities the experimenter would give them. Thus, this was a task-contingent reward. In order to make this contingency especially salient, the experimenter had the children write *OK* and sign their name on a piece of paper that read, "I will do the puzzle, tell the story, and make the collage if Beth will let me take 2 pictures with the camera." It is important that all children, even those in the reward conditions, did the picture-taking activity before the other activities. Thus, the reward was "consumed" before the activities required by the contract were performed.

In the nonreward conditions, once the picture-taking was finished, the experimenter went on to give the children each of the three creativity tasks in different counterbalanced orders. For the rewarded children, the signed contract was kept within view, and the experimenter reminded them of their agreement as each of the activities was introduced.

Rather than have the children bring their pictures back to the classroom, the experimenter kept all photos in a large "School Pictures" album throughout the duration of the study. In this way, we controlled for children coming into the experimental session with clear and salient expectations about the rewards they were to receive.

At the time that each of the three target activities was presented, a labeling variable was also introduced. For children in the work conditions, the experimenter said that she had something she would like them to work on for a few minutes. She then asked them to begin working. For children in the play conditions, the experimenter explained that she had something she would like them to play with for a few minutes, and then she asked them to begin playing. For children in the final group, free from labeling, the experimenter told children that she had something for them to do. No further description was given, and she asked them to begin. Children were given 7 min to complete each of the three tasks. During each 7-min period, the experimenter was occupied elsewhere in the room so that the children would not feel closely observed. At the end of each period (assuming that the children had not yet made clear that they had completed the activity), the experimenter indicated that it was time to finish.

On completing each activity, children made self-reports of affect. A rating scale adapted from Morgan (1981) and consisting of a set of five increasingly large circles was employed. The experimenter told subjects that she wished to find out how they felt and instructed them to choose one of the circles, representing a range from *very unhappy* to *very happy*. Following this procedure, a similar continuum of circles was used to assess task interest. Finally, children in the no-label groups were asked, "If you were to tell another kid about what you did here today, would you say that you worked or you played?"

To obtain a behavioral measure of interest, we had the children participate individually in another session with another experimenter about a week after the main experimental session. This experimenter explained that she wanted to "see what kids like to play with," and she gave them a 10-min free-play period during which they could choose among five activities (including the target activities from the first session). The experimenter occupied herself in a corner of the room during this period and unobtrusively recorded the amount of time children spent with each of the tasks.

## Results

Three elementary school teacher-judges rated each of the 115 stories on creativity. These subjective assessments of creativity were obtained following procedures outlined by Amabile (1982a). Reliability was extremely high (.91), and a sum over all judges' ratings was computed for each product. There were no effects of children's age or sex on this creativity measure, and no interactions with the independent variables.

Story creativity means revealed that across task labels, children in the nonreward groups produced more creative stories than children in the reward groups: no-reward/work label,  $M = 11.00$  (with the lowest possible score being 7 and the highest possible being 21); reward/work label,  $M = 9.67$ ; no-reward/play label,  $M = 12.14$ ; reward/play label,  $M = 8.68$ ; no reward/no label,  $M = 8.95$ ; reward/no label,  $M = 8.00$ . A  $2 \times 3$  (Reward  $\times$  Task Label) analysis of variance (ANOVA) on the creativity ratings revealed a significant main effect for reward,  $F(1, 107) = 6.125$ ,  $p < .015$ . There was no significant effect for label,  $F(2, 107) = 2.161$ ,  $p < .120$ , and no significant effect for the Reward  $\times$  Label interaction,  $F(2, 107) = 2.160$ ,  $p < .120$ . By paired comparisons, the reward/play group was judged significantly lower in creativity than the nonreward/play group,  $t(42) = -2.84$ ,  $p < .007$ .

Neither the affect nor interest self-reports revealed significant main effects or interactions of the independent variables, yet a chi-square analysis of children's description of their experimental participation as either work or play revealed a general trend in the predicted direction. That is, children in the no-label group were more likely to describe the task as *work* if they had been offered reward, and more likely to label it as *play* if no reward was offered. Behavioral measures of intrinsic interest during the free-play period revealed no significant effects.

Correlational analyses revealed one pattern suggesting a relation between intrinsic interest and creativity: Story creativity scores were significantly correlated with measures of time spent with the target book during a subsequent free-play period ( $r = .32$ ). No significant correlations were found between story creativity and age or Harter Scale scores.

Thirteen artist-judges rated the collages on creativity, with a reliability of .76. And 7 mathematicians rated the puzzles, yielding a reliability of .92. ANOVAs on the creativity ratings for these products revealed no significant effects.

## Study 2

Study 1 provided some support (on the verbal measure) for the hypothesis that reward will undermine creativity. However, it provided only weak evidence that rewards might undermine creativity by leading children to think of an activity as work rather than play. Study 2 was designed to accomplish two ends: (a) to obtain stronger support for the reward hypothesis by again testing it with multiple measures of children's creativity and (b) to examine the effect of reward from the means-end perspective (a perspective that does not necessarily require the labeling of tasks as *work* or *play*). Contracting for reward should lead to viewing the activity as simply a means to an end and, as a consequence, should lower intrinsic motivation and creativity; however, receiving the reward as simply a part of the presented ac-

tivities should have no such effects. Thus, in this  $2 \times 2$  (No Reward vs. Reward  $\times$  No Choice vs. Free Choice) factorial design, presentation of reward was completely crossed with choice of whether to do the activity. Only those who freely choose to do a task (the means) in order to obtain a reward (the end) should perceive themselves as having contracted for that reward and, as a consequence, should display lower creativity. Those who receive the reward as simply another activity should have no such means-end view toward the task and the reward and should display no creativity decrements.

### Method

#### Subjects

The subjects in this study were 80 students from Grades 3, 4, and 5 at a parochial school in eastern Massachusetts. Their ages ranged from 8 to 11 years. Students were individually asked to participate after consent was received from their parents. Subjects were randomly assigned to one of the four conditions: choice/reward, choice/no reward, no choice/reward, or no choice/no reward. All sessions were conducted by a female experimenter.

#### Procedure

Each class was first approached as a whole and administered the Harter Scale (Harter, 1981), in a procedure similar to that used in Study 1. Children then participated in the experimental sessions individually. The experimenter began the sessions by telling the children that she had some things for them to work on. After a brief explanation of the tasks (collage-making and storytelling), children in the choice/reward condition were told:

You can do these things or you can go back to your classroom if you want, but if you promise to work on these things for me, I will let you, as a reward, first take two photographs with this camera. Some kids decide to stay and work on the activities for the reward and some kids decide to leave. What would you like to do?

After they agreed to stay, children in this condition were asked to sign a contract similar to the one used in Study 1.

In the choice/no-reward condition, after the tasks were explained, children were told: "You can do these things or you can go back to your classroom if you want. Some kids decide to stay and work on the activities and some kids decide to leave. What would you like to do?" (Altogether, 3 children from the two choice conditions chose to leave at this point and were immediately allowed to return to their classroom.)

In the no-choice/reward condition, after a brief explanation of the tasks involved, children were told: "Because you are going to work on these things for me, as a reward, I am first going to let you take two photographs with this camera." And in the no-choice/no-reward condition, picture-taking was simply introduced as one of three tasks to be done.

In a procedure similar to that used in Study 1, picture-taking with the camera was the first activity. The two tasks that followed, collage-making and storytelling (previously described in Study 1) were presented in different counterbalanced orders. Importantly, evaluation of the children's products was not mentioned in any way. Furthermore, children who had contracted for reward could not have been more concerned about evaluation than the other children, because they had already received the reward before they started the experimental tasks. After both tasks were finished, children completed the self-report measure of affect and the work-play label measure used in Study 1.

### Results

Using the consensual assessment technique employed in Study 1 (Amabile, 1982a), the 80 collages produced in this study were independently rated on 40-point scales of creativity by 11 artist-judges. Interrater reliability was .80. The 80 stories were independently rated on 40-point scales of creativity by 3 school-teachers. Interrater reliability for the stories was also high, at .83. As in Study 1, there were no effects of child age or sex on either creativity measure, and no interactions with the independent variables.

For both the collages and the stories, a creativity score was calculated by summing the judges' ratings. A  $2 \times 2$  ANOVA on these creativity scores showed a significant interaction between reward and choice for both the stories,  $F(1, 76) = 7.486, p < .008$ , and the collages,  $F(1, 76) = 5.647, p < .020$ .

We predicted that subjects in the choice/reward condition (contracted reward) would produce collages and stories lower in creativity than the other three groups. This hypothesis was supported for both creativity tasks. On a scale ranging from a possible minimum of 0 to a possible maximum of 120, the story creativity means were: no choice/no reward,  $M = 43.90$ ; no choice/reward,  $M = 53.10$ ; choice/no reward,  $M = 47.00$ ; and choice/reward,  $M = 28.50$ . On a scale ranging from a possible minimum of 0 to a possible maximum of 440, the collage creativity means were no choice/no reward,  $M = 213.00$ ; no choice/reward,  $M = 226.40$ ; choice/no reward,  $M = 232.95$ ; and choice/reward,  $M = 186.85$ . These patterns of means are illustrated in Figures 1 and 2.<sup>3</sup>

For the stories, pairwise comparisons revealed that the choice/reward condition was significantly lower in creativity than the choice/no-reward condition,  $t(39) = -2.94, p < .006$ , the no-choice/reward condition,  $t(39) = -3.50, p < .001$ , and the no-choice/no-reward condition,  $t(39) = -2.50, p < .018$ .

For the collages, paired comparisons revealed that the choice/reward condition was significantly lower in creativity than the choice/no-reward condition,  $t(39) = -2.96, p < .005$ , and the no-choice/reward condition,  $t(39) = -2.20, p < .034$ . Although not significantly different, the mean for the choice/reward condition,  $M = 186.85$ , was lower than the mean for the no-choice/no-reward condition,  $M = 213.00$ .

Analyses of the self-report measures of affect and the work-play label measures revealed no significant effects. In the correlations, however, there were two noteworthy patterns. First, as in Study 1, there was no significant correlation between creativity and age. Second, children who scored higher on the Preference for Challenge dimension of the Harter Scale tended to produce collages judged as more highly creative ( $r = .22$ ).

### Study 3

This study was designed as a conceptual replication of Study 2. Once again, reward and choice were crossed in a  $2 \times 2$  factorial

<sup>3</sup> The analysis of variance (ANOVA) revealed a significant main effect of choice on storytelling creativity,  $F(1, 56) = 8.50, p < .005$ , but this, of course, is completely qualified by the interaction. There was no main effect of choice on collage creativity and no main effect of reward on either dependent measure.

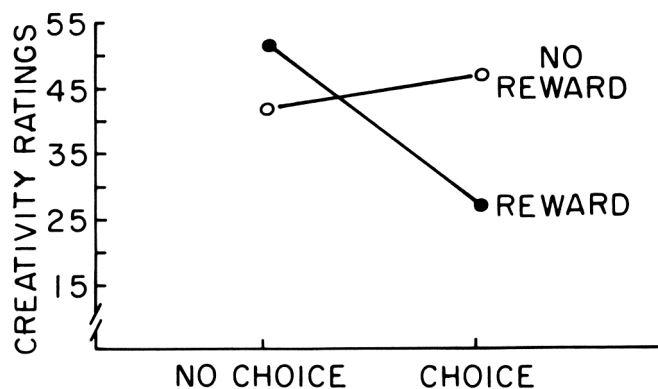


Figure 1. Mean creativity of stories in Study 2, on a scale ranging from 0 to 120.

design. Study 3 differed from Study 2 in a number of respects, however. The most important difference was that the subjects were adult women, rather than young boys and girls. In addition, a monetary reward was used, and the money (though shown to rewarded subjects before task engagement) was actually awarded only after the task was completed. The creativity task used here was the same collage-making activity as that presented to the children in Studies 1 and 2.

### Method

#### Subjects

Sixty undergraduate women were recruited for a study on "personality impressions" from an introductory psychology class. They came to the laboratory with the understanding that they would receive one hour of experiment credit toward a 3-hour course requirement. Subjects were randomly assigned in equal numbers to the four conditions of the experiment. All sessions were conducted by a female experimenter.

#### Procedure

Subjects participated in individual sessions. When a subject arrived at the laboratory, she was told that the study involved reading about and watching videotapes of a person in various situations and giving impressions of that person's personality on several rating scales. The experimenter then asked subjects to read a brief transcript of a conversation the stimulus person had had and to complete a questionnaire about her. Following this, the experimenter asked subjects to watch a brief videotape of the stimulus person. Within a few seconds, it became clear that there was no sound track on the tape. The experimenter expressed dismay that the machine was "broken again," and said it would be necessary to end the experiment at that point.

Because only about 10 min of the hour had elapsed, it was assumed that subjects would view as reasonable a request to participate in another experiment during this time. These two completely different experiments were presented to allow subjects in the choice conditions a self-perception that they had freely chosen to do the second task, having completed any obligations they might have felt in coming to the laboratory in the first place. The second activity presented to subjects was the creativity task, and it was here that the independent variable manipulations were delivered.

To subjects in the no-choice/no-reward condition the experimenter said, "Well, I'm doing another study, and I guess I can have you do that

instead for the rest of the time. It involves spending about 15 minutes making a paper collage." She then presented subjects with the materials.

Instructions in the no-choice/reward condition were identical, except that subjects were additionally told of a payment they would receive before leaving the laboratory: "I'm paying subjects \$2 in that study, so what I'll do is give you credit for the part you just did and you'll earn \$2 for doing the second study."

In the choice conditions, the experimenter asked for an explicit verbal contract concerning the subject's consent to participate. In the choice/no-reward condition, she said: "Well, I'm doing another study, and I guess I could have you do that instead for the rest of the time. It involves spending about 15 minutes making a paper collage. Would you be willing to do that?"

Instructions in the choice/reward condition were identical, except that the experimenter added, "I can give you credit for the part you just did, and since I'm paying subjects for the second study, you can earn \$2 if you'll agree to do the collage. Would you be willing to do that for \$2?" All subjects in the choice conditions did agree to participate in the collage study.

Importantly, all mention of evaluation of products was avoided. The payment in the choice/reward condition was presented as contingent only on doing the collage experiment (task-contingent reward). No criteria for successful completion, either explicit or implicit, were given.

Following this introduction, the experimenter set out the collage materials (a large cardboard, several pieces of colored origami paper in a variety of sizes and shapes, and glue) and placed \$2 on a corner of the table in front of subjects in the reward conditions. Then, she gave subjects a consent form for the collage study; this form reiterated the crucial reward instructions for subjects in those conditions.

The experimenter then explained that the study was investigating the influence of the collage-making activity on mood. She asked subjects to spend about 15 min using the materials in any way they wished to make a collage that conveyed a feeling of "silliness." (This theme was used to reduce extraneous sources of variability and to elevate baseline levels of creativity (cf. Amabile, 1982a).) Subjects were told that they would subsequently complete a questionnaire on their reactions to the collage-making.

After leaving subjects alone for 15 min to complete their collages, the experimenter returned and presented them with a questionnaire containing several items designed to assess their intrinsic interest in the activity: enjoyment of the activity, satisfaction with the collage, feelings of

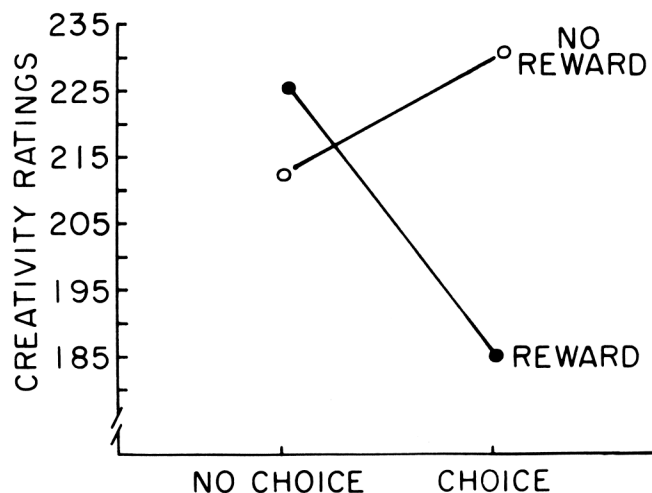


Figure 2. Mean creativity of collages in Study 2, on a scale ranging from 0 to 440.

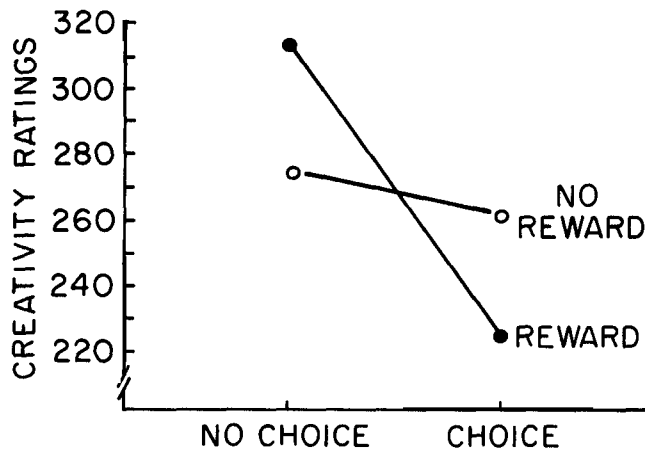


Figure 3. Mean creativity of collages in Study 3, on a scale ranging from 0 to 560.

being pressured while working, level of interest in the activity, perception of the activity as more like work or more like leisure, willingness to volunteer for the activity in the future, and self-perception of being intrinsically or extrinsically motivated. In addition, there was an open-ended item: "In one sentence, describe your mood while working on the collage."

### Results

As in Studies 1 and 2, the consensual technique for the assessment of creativity (Amabile, 1982a) was used to obtain creativity measures on the collages produced by subjects in this study. Fourteen artists independently viewed and rated each of the 60 collages on a 40-point creativity scale. Because the interjudge reliability of these ratings was acceptable (.75), a sum over all judges' creativity ratings was computed for each collage.

The results here provide a close replication of the results in Study 2. Here, on a scale ranging from a possible minimum of 0 to a possible maximum of 560, the means were no-choice/no-reward,  $M = 272.87$ ; no-choice/reward,  $M = 312.20$ ; choice/no-reward,  $M = 262.27$ ; choice/reward,  $M = 224.33$ . As in Study 2, a  $2 \times 2$  ANOVA on the creativity ratings revealed a significant Reward  $\times$  Choice interaction,  $F(1, 56) = 5.23$ ,  $p < .026$ . As illustrated in Figure 3, this interaction does result, in part, from the low creativity of subjects in the contracted-for reward group (choice/reward). Indeed, as predicted (and as found in Study 2), the lowest level of creativity was found in this condition. By pairwise comparisons, the choice/reward condition is significantly lower in creativity than the no-choice/reward condition,  $t(28) = 3.70$ ,  $p < .001$ , and the no-choice/no-reward condition,  $t(28) = 2.53$ ,  $p < .017$ , and it is nearly significantly lower than the choice/no-reward condition,  $t(28) = 2.00$ ,  $p < .055$ . No other pair-wise comparisons revealed significant differences.<sup>4</sup>

None of the items on the questionnaire revealed significant main effects or interactions of the independent variables, but correlational analyses do suggest a relation between intrinsic interest in the activity, enjoyment of the activity, and creativity. Creativity scores were significantly correlated with expressed enjoyment of the collage activity ( $r = .32$ ) and satisfaction with the

collage ( $r = .28$ ), and there were nearly significant correlations with level of expressed interest in the activity ( $r = .21$ ) and overall motivation ( $r = .20$ ). On this last measure, higher creativity is associated with a greater self-perceived intrinsic motivation toward the collage activity.

There was one item on the questionnaire that directly assessed subjects' affect while working on the collage. This was the open-ended question that asked them to describe their mood. Two independent raters who were blind to condition read subjects' responses to this question and assigned an affect score from *negative mood* (1) to *positive mood* (3). They agreed perfectly on 93% of the responses and, on the others, their ratings were never more than 1 scale point apart.<sup>5</sup> An ANOVA on these ratings revealed a significant interaction that largely parallels the interaction in the creativity analysis. The no-choice/reward group is higher than any other on positive affect ( $M = 2.87$ ). Indeed, it is significantly higher than the no-choice/no-reward group ( $M = 2.40$ ),  $t(28) = 2.21$ ,  $p < .05$ . As with creativity, the choice/no-reward group is intermediate on affect ( $M = 2.73$ ). The only deviation from the pattern obtained for creativity is that, here, the choice/reward group is not lowest on positive affect ( $M = 2.60$ ). The correlation between creativity and affect as assessed by this measure was marginally significant,  $r = .23$ .

Thus, in addition to demonstrating negative effects of contracted-for reward on creativity, this study provides some evidence of a link between affect and creativity. It may be that subjects in the no-choice/reward condition experienced more positive affect (and displayed somewhat higher creativity) than other subjects because, rather than representing contracted-for payment, the reward to them represented a pleasant extra bonus.

### Discussion

These studies provide particularly strong support for the hypothesis that working for reward can lead to decrements in creativity. For a number of reasons, this effect can be considered reliable and general. First, the creativity tasks used in these studies included both the verbal (storytelling) and the artistic (collage-making). Second, the subject populations included elementary-school boys and girls from a wide age range (5 years to 11 years), as well as undergraduate women. Third, the rewards themselves were of very different types. In Study 3, the reward was a tangible object (money), as in most psychological studies of reward. In Studies 1 and 2, however, the reward was an activity—taking pictures with an instant camera. Fourth, these rewards were consumed in different ways; the picture-taking occurred before execution of the creativity task, but the award of money occurred afterwards. Thus, the demonstrated negative effect of contracted-for reward on creativity holds for different creativity tasks, different subject populations, different rewards, and different timings of reward presentation.

<sup>4</sup> As in Study 2, there was a significant main effect of choice that is completely qualified by the interaction. There was no main effect of reward.

<sup>5</sup> Disputes were settled through discussion; the raters were blind to subjects' conditions.

In its effects on creativity, contracted-for reward is similar to other extrinsic constraints, such as evaluation expectation, surveillance, competition, and restricted choice (Amabile, 1979, 1982b; Amabile & Gitomer, 1984; Amabile et al., 1983). According to the intrinsic motivation hypothesis of creativity, this general undermining effect is mediated by a decreased intrinsic motivation toward the task. As noted earlier, several theorists have proposed that intrinsic motivation will be undermined by extrinsic constraints such as reward only when the task is perceived as a means to the extrinsic end (Calder & Staw, 1975; Deci, 1975; Kruglanski et al., 1971; Lepper et al., 1973; Ross 1977; Staw, 1976). There have been some convincing demonstrations that a perceived means-end contingency between task and reward is necessary for an undermining of subsequent intrinsic interest. For example, in two early overjustification studies, it was found that only those subjects who believed they engaged in a task in order to obtain reward showed a decrement in subsequent intrinsic interest (Kruglanski et al., 1971; Lepper et al., 1973). Those same studies showed that reward will not undermine interest if it is not seen as an end for which task engagement is the means.

The present series of studies represents an advance over previous intrinsic motivation research in two ways. First, Studies 2 and 3 provide an even more stringent test than that found in previous research of the necessity for a perceived means-end relation between task and reward before detrimental effects will be observed. Not only were subjects in the two reward conditions of these studies expecting to receive reward but, in both conditions, the reward was actually presented for task engagement. The only difference between the two reward conditions lay in the subjects' explicit agreement to engage in the task in order to obtain the reward or the absence of any such agreement. The second important advance over previous studies, which were limited to effects of reward on subsequent interest, is the demonstration of undermining effects on actual performance—specifically, the creativity of actual performance.

In neither Study 2 nor Study 3 was there a significant main effect of choice on creativity. On the basis of the intrinsic motivation hypothesis, a positive effect of choice might have been expected; people who are afforded a choice about whether to do a task at all might be expected to feel more self-determined and intrinsically motivated (cf. Deci & Ryan, in press) and, as a result, they might be expected to produce more creative work. Indeed, in a recent study (Amabile & Gitomer, 1984), nursery-school children who were given a free choice about which collage materials to use made significantly more creative collages than children whose choice of materials was restricted by the experimenter. There is an important difference in the nature of the choice, though. In the nursery-school study, the choice concerned *how* to do the activity, not *whether* to do it. In the present studies (2 and 3), the choice concerned whether to do the activity. It may be that choices about methods of task performance are, in fact, more important for intrinsic motivation and creativity than choices about whether to perform a task at all. This notion emerges from content analyses of interviews with research and development scientists (Amabile, 1984): Freedom is an essential ingredient in critical incidents of high creativity in the work experience of these scientists. But, most often, it is freedom in

deciding how to carry out a scientific project, not freedom in deciding which project will be done.

Unfortunately, the present studies do not allow definitive conclusions on the mediation of lowered creativity under conditions of contracted-for reward. Although the intrinsic motivation hypothesis specifies that lowered intrinsic motivation leads to the decrement, adult subjects' responses on the postexperimental questionnaire in Study 3 provide only weak support for this explanation. The independent variables had no significant impact on adults' reported intrinsic interest, and only some of the various intrinsic interest measures showed correlations with creativity. Of course, these correlations might result from a greater enjoyment and satisfaction experienced by subjects who produced creative collages.

Evidence on motivational mechanisms in our studies with children is not exceptionally strong, either. In Study 1, the independent variables had no effect on children's self-reported affect or interest in the activity. However, as in the adult study, there is some support for the connection between intrinsic interest and creativity. Storytelling creativity scores were significantly correlated with measures of time spent with the target book during a subsequent free-play period. In Study 2, also, there was some evidence of a relation between intrinsic motivation and creativity. Children who scored high on one of Harter's intrinsic motivation scales tended to produce collages that were judged as highly creative.

As noted earlier, one specific mechanism that has been proposed to explain decrements in interest following reward is the implicit labeling of a task as *work* if it is done for reward. However, our attempt in Study 1 to capture this proposed phenomenon by explicitly labeling the creativity task as *work* or *play* failed. Obviously, it is possible that this manipulation was not sufficiently strong to provide an adequate test of the hypothesis. However, the complete lack of any effect of the labeling variable on rated creativity or on interest leads us to suspect that perhaps an internal implicit labeling of rewarded tasks as work is quite different from an external explicit labeling, or that this proposed internal implicit labeling does not in fact occur.

Whether or not the creativity effects can be described in terms of motivational differences (either affectively based or cognitively based), it is interesting to go beyond this level of explanation. Why should it be the creative aspects of performance that suffer under reward conditions? Some research suggests that performance differences between rewarded and nonrewarded subjects might result from differences in attention to nonobvious aspects of the task during engagement. Work on incidental learning is particularly relevant to this attentional explanation. In three separate studies, subjects working for reward did significantly more poorly on incidental learning tasks than did nonrewarded subjects. In one (Bairick, Fitts, & Rankin, 1952), rewarded subjects did more poorly in recalling a sequence of flashing lights that had appeared in the periphery of their visual fields during the rewarded task (a tracking exercise). In another (Johnson & Thomson, 1962), rewarded subjects remembered significantly fewer nonsense syllables overheard during serial learning than did nonrewarded subjects. In the third (McNamara & Fisch, 1964), rewarded subjects recalled fewer words that appeared with, but were irrelevant to, the words used in a verbal learning task.



Clearly, these results suggest a narrowing of attention to goal-relevant stimuli during engagement in externally rewarded tasks.

It is possible that subjects in the reward condition of our Study 1 and in the choice/reward condition of Studies 2 and 3 viewed the task as simply a job they had to do and, thus, that they focused narrowly on simply finishing the collage. Subjects in the other conditions, by contrast, might have viewed the task not as a job but as an opportunity for exploration and creativity; they might have been more likely to attend to subtle aspects of the task and the materials, coming up with more unusual ways of working with those materials. This attentional explanation could be tested in future research by posttesting of subjects' memory for various aspects of the task and materials.

Whether the mechanism is cognitive or affective, and whether it makes sense to describe this effect in terms of motivational state, the effect itself is clear: Explicitly contracting to do an activity in order to obtain a reward leads to lower levels of creativity than contracting to do the activity for no reward, or simply being presented with the task, or being presented with the task and a subsequent reward. The implications of this finding are intriguing. It may be that commissioned work will, in general, be less creative than work that is done out of pure interest. And, within an ongoing work organization or classroom setting, it may be that tying specific rewards to specific tasks chosen by workers and students will be less conducive to creativity than simply allowing choice of activities without specific pay-offs attached to each task.

### References

- Allen, W. (1948). *Writers on writing*. London: Phoenix House.
- Amabile, T. M. (1979). Effects of external evaluation on artistic creativity. *Journal of Personality and Social Psychology*, *37*, 221-233.
- Amabile, T. M. (1982a). Social psychology of creativity: A consensual assessment technique. *Journal of Personality and Social Psychology*, *43*, 997-1013.
- Amabile, T. M. (1982b). Children's artistic creativity: Detrimental effects of competition in a field setting. *Personality and Social Psychology Bulletin*, *8*, 573-578.
- Amabile, T. M. (1983a). *The social psychology of creativity*. New York: Springer-Verlag.
- Amabile, T. M. (1983b). Social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, *45*, 357-376.
- Amabile, T. M. (1984, August). Creativity motivation in research and development. In D. Campbell (Chair), *Creativity in the corporation*. Symposium conducted at the meeting of the American Psychological Association, Toronto, Canada.
- Amabile, T. M. (1985). Motivation and creativity: Effects of motivational orientation on creative writers. *Journal of Personality and Social Psychology*, *48*, 393-399.
- Amabile, T. M., & Gitomer, J. (1984). Children's artistic creativity: Effects of choice in task materials. *Personality and Social Psychology Bulletin*, *10*, 209-215.
- Amabile, T. M., Goldfarb, P., & Brackfield, S. (1983). *Social influences on creativity: Effects of evaluation, coercion, and surveillance*. Unpublished manuscript, Brandeis University, Waltham, MA.
- Bahrick, H. P., Fitts, P. M., & Rankin, R. E. (1952). Effects of incentive upon reactions to peripheral stimuli. *Journal of Experimental Psychology*, *44*, 400-406.
- Barron, F. (1968). *Creativity and personal freedom*. New York: Van Nostrand.
- Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. 1-62). New York: Academic Press.
- Calder, B., & Staw, B. (1975). Self-perception of intrinsic and extrinsic motivation. *Journal of Personality and Social Psychology*, *31*, 599-605.
- Campbell, D. (1960). Blind variation and selective retention in creative thought as in other knowledge processes. *Psychological Review*, *67*, 380-400.
- Crutchfield, R. (1962). Conformity and creative thinking. In H. Gruber, G. Terrell, & M. Wertheimer (Eds.), *Contemporary approaches to creative thinking* (pp. 120-143). New York: Atherton Press.
- Dansky, J., & Silverman, I. (1975). Play: A general facilitator of fluency. *Developmental Psychology*, *11*, 104.
- DeCharms, R. (1968). *Personal causation*. New York: Academic Press.
- Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, *18*, 105-115.
- Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (1980). The empirical exploration of intrinsic motivational processes. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 13, pp. 1-55). New York: Academic Press.
- Deci, E. L., & Ryan, R. M. (in press). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Duncker, K. (1945). On problem solving. *Psychological Monographs*, *58* (Whole No. 270).
- Feingold, B. D., & Mahoney, M. J. (1975). Reinforcement effects on intrinsic interest: Undermining the overjustification hypothesis. *Behavior Therapy*, *6*, 367-377.
- Garbarino, J. (1975). The impact of anticipated reward upon cross-age tutoring. *Journal of Personality and Social Psychology*, *32*, 421-428.
- Glucksberg, S. (1962). The influence of strength of drive on functional fixedness and perceptual recognition. *Journal of Experimental Psychology*, *63*, 36-41.
- Glucksberg, S. (1964). Problem-solving: Response competition and the influence of drive. *Psychological Reports*, *15*, 939-942.
- Greene, D., & Lepper, M. R. (1974). Effects of extrinsic rewards on children's subsequent intrinsic interest. *Child Development*, *45*, 1141-1145.
- Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom. *Developmental Psychology*, *17*, 300-312.
- Johnson, R., & Thomson, C. (1962). Incidental and intentional learning under three conditions of motivation. *American Journal of Psychology*, *75*, 284-288.
- Kelley, H. H. (1973). The processes of causal attribution. *American Psychologist*, *28*, 107-128.
- Koestler, A. (1964). *The act of creation*. New York: Dell.
- Kruglanski, A. W., Friedman, I., & Zeevi, G. (1971). The effects of extrinsic incentive on some qualitative aspects of task performance. *Journal of Personality*, *39*, 606-617.
- Lepper, M. R., & Greene, D. (Eds.). (1978). *The hidden costs of reward*. Hillsdale, NJ: Erlbaum.
- Lepper, M. R., Greene, D., & Nisbett, R. (1973). Undermining children's intrinsic interest with extrinsic rewards: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology*, *28*, 129-137.
- Lieberman, J. N. (1965). Playfulness and divergent thinking: An investigation of their relationship at the kindergarten level. *Journal of Genetic Psychology*, *107*, 219-224.
- Loveland, K., & Olley, J. (1979). The effect of external reward on interest and quality of task performance in children of high and low intrinsic motivation. *Child Development*, *50*, 1207-1210.
- McGraw, K. (1978). The detrimental effects of reward on performance: A literature review and a prediction model. In M. Lepper & D. Greene (Eds.), *The hidden costs of reward* (pp. 33-60). Hillsdale, NJ: Erlbaum.

- McGraw, K., & McCullers, J. (1979). Evidence of a detrimental effect of extrinsic incentives on breaking a mental set. *Journal of Experimental Social Psychology, 15*, 285-294.
- McNamara, H. J., & Fisch, R. I. (1964). Effect of high and low motivation on two aspects of attention. *Perceptual and Motor Skills, 19*, 571-578.
- Morgan, M. (1981). The overjustification effect: A developmental test of self-perception interpretations. *Journal of Personality and Social Psychology, 40*, 809-821.
- Reiss, S., & Sushinsky, L. W. (1975). Overjustification competing responses, and the acquisition of intrinsic interest. *Journal of Personality and Social Psychology, 31*, 1116-1125.
- Rosenfield, D., Folger, R., & Adelman, H. F. (1980). When rewards reflect competence: A qualification of the overjustification effect. *Journal of Personality and Social Psychology, 39*, 368-376.
- Ross, M. (1977). The self-perception of intrinsic motivation. In J. H. Harvey, W. J. Ickes, & R. K. Kidd (Eds.), *New directions in attribution research* (Vol. 1, pp. 121-141). Hillsdale, NJ: Erlbaum.
- Ryan, R. M., Mims, V., & Koestner, R. (1983). Relation of reward contingency and interpersonal context to intrinsic motivation: A review and test using cognitive evaluation theory. *Journal of Personality and Social Psychology, 45*, 736-750.
- Simonton, D. K. (1977). Creative productivity, age, and stress: A biographical time-series analysis of 10 classical composers. *Journal of Personality and Social Psychology, 35*, 791-804.
- Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. New York: Appleton-Century-Crofts.
- Staw, B. M. (1976). *Intrinsic and extrinsic motivation*. Morristown, NJ: General Learning Press.
- Stein, M. I. (1974). *Simulating creativity* (Vol. 1). New York: Academic Press.
- Stein, M. I. (1975). *Simulating creativity* (Vol. 2). New York: Academic Press.
- Tang, T. L., & Baumeister, R. F. (1984). Effects of personal values, perceived surveillance, and task labels on task preference: The ideology of turning play into work. *Journal of Applied Psychology, 69*, 99-105.
- Torrance, E. P. (1962). *Guiding creative talent*. Englewood Cliffs, NJ: Prentice Hall.
- Zuckerman, H. (1967). Nobel laureates in science: Patterns of productivity, collaboration, and authorship. *American Sociological Review, 32*, 391-403.

Received March 29, 1985

Revision received August 16, 1985 ■

---

**Manuscripts Accepted for Publication in the Section  
Personality Processes and Individual Differences**

- Energy, Tiredness, and Tension Effects of a Sugar Snack Versus Moderate Exercise. Robert Thayer (Department of Psychology, California State University, Long Beach, California 90840).
- Selecting Representative Trait Adjectives. Dean Peabody (Department of Psychology, Swarthmore College, Swarthmore, Pennsylvania 19081).
- Emotional States and Memory Biases: The Effects of Cognitive Priming and Mood. William Rholes (Department of Psychology, Texas A & M University, College Station, Texas 77843), John H. Riskind, and James W. Lane.
- Reciprocity of Social Exchange and Social Satisfaction Among Older Women. Karen Rook (Department of Social Psychology, University of California, Irvine, California 92717).
- Discriminating Patterns of Emotions in 10- and 11-Year-Old Children's Anxiety and Depression. Samuel Blumberg and Carroll E. Izard (Department of Psychology, University of Delaware, Newark, Delaware 19711).
- Repression and the Inaccessibility of Affective Memories. Penelope Davis (Department of Psychology, University of Sydney, Sydney, New South Wales, Australia 2006) and Gary Schwartz.
- Validation of the Five-Factor Model of Personality Across Instruments and Observers. Robert McCrae (Gerontology Research Center, Baltimore City Hospitals, Baltimore, Maryland 21224).
- Dimensions of Favorable Self-Presentations. David L. Roth, C. R. Snyder (Department of Psychology, University of Kansas, Lawrence, Kansas 66045) and Lynn M. Pace.
- Experimentally Provided Social Support. Irwin Sarason (Department of Psychology, University of Washington, Seattle, Washington 98195) and Barbara Sarason.
- Personality and Compatibility: A Prospective Analysis of Marital Stability and Marital Satisfaction. Lowell Kelly (Department of Psychology, Wesleyan University, Middletown, Connecticut 06457) and James Conley.
-