Can Salient Reward Increase Creative Performance Without Reducing Intrinsic Creative Interest?

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Over the past quarter century, the view that reward reduces task interest and creativity (Eisenberger & Cameron, 1996) has become widely accepted. This loss of interest has been explained as a negative reaction to the diminished self-determination produced by the requirement to alter one's behavior (Deci, 1971). A second explanation involves a change in the perceived cause of one's actions from an interest in the task to an interest in the reward (Lepper et al., 1973). The expectancy of reward is generally thought to reduce creativity by diverting "attention from the task itself and nonobvious aspects of the environment that might be used in achieving a creative solution" (Amabile, 1983, p. 120). Such lessening of attention to the task, together with the desire to obtain the reward with least effort, is commonly argued to reduce the spontaneity and flexibility of performance (Amabile & Cheek, 1988, p. 60; Amabile, Hennessey, & Grossman, 1986; see also Balsam & Bondy, 1983; McGraw, 1978; Reiss & Sushinsky, 1975, 1976; Sternberg & Lubart, 1991).

These accounts assert that tangible reward, such as money and other prizes, is more salient than verbal reward and therefore should produce greater detrimental effects on intrinsic task interest and creativity (e.g., Amabile, 1983; Deci & Ryan, 1985; Lepper et al., 1973). Especially strong detrimental effects should occur with a high quantity, quality, or proximity of tangible reward; such increased reward salience would reduce intrinsic task interest by heightening attention to the reward (Hennessey & Amabile, 1988), by strengthening perceptions of low self-determination (Deci & Ryan, 1985), and by increasing attributions of reward's control over one's behavior (Lepper et al., 1973). We report findings that, contrary to prevalent views, salient reward can be used to strengthen creative performance without any loss of intrinsic creative interest.

Creative performance refers to novel behavior that meets a standard of quality or utility (e.g., Guilford, 1968; Maltzman, 1960; Shalley, 1991; Wallach & Kogan, 1965; Winston & Baker, 1985). Divergent thinking, the most frequently studied component of creativity, involves the production of varied responses to a problem or question that has multiple solutions (Guilford, 1968; Runco, 1991; Winston & Baker, 1985). Considerable evidence gathered by cognitive researchers suggests that reward reduces divergent thought. For example, Amabile et al. (1986) allowed school children to use a camera to take photographs (the reward) in exchange for which the students were later to construct collages and stories. The creativity of the collages and stories produced by these children was inferior, as rated by judges, to the creativity of the collages and stories of other children who worked without the stated contingency.

Cognitive investigators have argued that reward for one activity produces a generalized reward expectancy that inhibits creative performance in later tasks. For instance, preadolescent children received a painting activity followed by a collage-construction task (Hennessey & Amabile, 1988). Half the children received a positive evaluation of their painting performance before they began the collages, whereas the remaining children received no evaluation. The verbal reward for painting was intended to establish a reward expectancy during later collage construction. As predicted, the children rewarded for painting subsequently produced collages judged to be less creative. These findings are consistent with the conclusion of a literature review that individuals given rewards "seem to work harder and produce more activity, but the activity is of a lower quality, contains more errors, and is more stereotyped and less creative than the work of comparable nonrewarded subjects working on the same problems" (Condry, 1977, pp. 470-471).

The categorical assertion that reward lessens creativity has major practical implications. Use of reward systems in educational settings, hospitals, and the workplace is frequently
claimed to harm recipients by reducing task involvement and creativity. For example, a primer for teachers on promoting classroom creativity published by the National Education Association contains the heading "How to Kill Creativity," with the following message:

The expectation of reward can actually undermine intrinsic motivation and creativity of performance. . . . A wide variety of rewards have now been tested, and everything from good-player awards to marshmallows produces the expected decrements in intrinsic motivation and creativity of performance. . . . For students who initially display a high level of interest in a task, an expected reward . . . makes them much less likely to take risks or to approach a task with a playful or experimental attitude. (Tegano, Moran, & Sawyers, 1991)

The conventional view that reward reduces creative performance conflicts with the behavioral argument that divergent thinking, as any discriminable response category, should be enhanced by systematic reward (cf. Maltzman, 1960; Pryor, Haag, & O’Reilly, 1969; Skinner, 1953; Torrance, 1970; Winston & Baker, 1985). For example, when Glover and Gary (1976) used a token economy to reward fourth and fifth-grade students for suggesting a variety of uses for common items, the novelty of stated uses increased. A review of 20 studies concluded that there is compelling evidence to support the view that rewarded creativity training effectively enhances divergent thought (Winston & Baker, 1985). Reward for divergent thinking in one task should have the important consequence of increasing the general tendency to behave creatively, as would be observed in subsequent tasks. For instance, Maltzman (1960) presented college students repeatedly with the same list of words and instructed them to respond with a free association to each word. The students received verbal approval for generating a new word every time they received a repeated presentation of a stimulus word. This procedure increased the originality of subsequent uses that the students gave for common physical objects.

These results seem to directly contradict the findings that reward lessens creativity. One explanation for the difference in outcomes is that the purported incremental effect of reward on creativity reported in behavioral studies may be the result of instructions that accompany the reward, rather than the reward itself (Amabile, 1983, p. 127). Because the great majority of behavioral studies of divergent thinking have been concerned with developing practical, effective training procedures, spoken directions or descriptive comments are generally included that explicitly inform experimental participants of the desirability of novel performance (cf. Goetz, 1989). In addition, the reward contingency can provide information concerning correct performance (Zimmerman, 1985); that is, the contingency between performance and reward informs individuals about appropriate behavior besides supplying an incentive for carrying out the behavior. The acknowledged cost of the behaviorists’ pragmatic approach to creativity training is the inability to separate the reinforcing effects of reward from the informational effects of task instructions and the reward contingency (Winston & Baker, 1985).

Despite these limitations of the behavioral studies, the generally accepted conclusion that reward has inherent detrimental effects on creativity may be premature. Cognitive studies often proceed from the assumption that rewarded tasks are “initially defined [by the reward recipient] more narrowly . . . simply as a means to an extrinsic end, rather than an opportunity for exploration and cognitive play” (Amabile & Cheek, 1988, p. 60). Some previous investigations, testing the view that reinforcement necessarily produces narrow, repetitive responses, used what appear to be self-fulfilling research designs in which reward for uncreative performance acted to reinforce uncreative performance (e.g., McGraw & McCullers, 1979; Schwartz, 1982).

Reward can be used in ways that do not produce simple, repetitive performance. Neuringer (1986, 1991, 1993) and others (Machado, 1989; Morris, 1987; Page & Neuringer, 1985; Pryor et al., 1969) have found that when sequences of choices are rewarded for randomness, animals and humans respond more randomly. Thus, the randomness of behavior, as well as simple or stereotyped performance, can be effectively enhanced by reward. The questions remain whether reward can also be used to increase the production of novel behaviors and whether this result can be achieved without reducing intrinsic creative interest.

Conditions of rewarded performance that should increase creativity and intrinsic creative interest can be derived from learned industriousness theory (Eisenberger, 1992). Learned industriousness theory characterizes effort as an unpleasant sensation produced by the intense or repeated performance of any activity. Various ways of increasing the degree of required performance in a given task are assumed to contribute to experienced effort. High levels of performance required in different tasks would produce similar sensations of effort. Thus, learned reactions to the effort required in any one task would influence the subsequent performance of both that task and other tasks.

Learned industriousness theory holds that if an individual is rewarded for putting a large amount of cognitive or physical effort into an activity, the sensation of high effort acquires secondary reward properties that lessen, to some degree, effort’s innate aversiveness. This reduced aversiveness of effort would increase the individual’s general readiness to expend effort in goal-directed tasks. For example, rewarding a high degree of performance by students in their spelling assignments should increase the effort they subsequently apply to math problems (Eisenberger, Heerdts, Hartli, Zinet & Bruckmeir, 1979). In contrast, low effort, when rewarded, would acquire secondary reward properties and become more preferred than previously to high effort. In addition, when high effort receives no greater reward than low effort, it would tend to lose previously established secondary reward properties and become more aversive. The net result of rewarding low effort would thus be the reduction of the general inclination to expend high effort to obtain reward.

Considerable evidence indicates that rewarded high effort does produce a generalized increase in industriousness. Raising the degree of required performance for one or more tasks increased the subsequent vigor and persistence of various other activities, including rats’ lever pressing and runway traversal (Eisenberger, Carlson, & Frank, 1979; Eisenberger, Carlson, Guille, & Shapiro, 1979; Eisenberger & Mastroen, 1986); depressed mental patients’ card sorting (Eisenberger, Heerdts, et al., 1979); learning disabled and typical preadolescent students’ handwriting, drawing, and mathematics performance (Eisen-
berger & Adornetto, 1986; Eisenberger, Heerdt, et al., 1979; Eisenberger, Mitchell, & Masterson, 1985; Eisenberger, Mitchell, McDermit, & Masterson, 1984); and college students' manipulatory behavior (Natio, Cooney, & Garell, 1979; Pitenger & Pavlik, 1988), perceptual identifications (Eisenberger & Leonard, 1980), essay writing (Eisenberger, Masterson, & McDermit, 1982; Eisenberger, McDermit, Masterson, & Over, 1983), anagram solving (Boyagian & Nation, 1981; Eisenberger, Kuhlman, & Cotterell, 1992), and resistance to cheating (Eisenberger & Masterson, 1983; Eisenberger & Shank, 1985). Lengthened training has been shown to produce quite durable generalized industriousness in both animals (Eisenberger, Weier, Masterson, & Theis, 1989) and humans (Eisenberger et al., 1984).

Learned industriousness theory assumes that individuals learn which dimensions of performance are rewarded and generalize high or low effort more to these performance dimensions than to other dimensions in subsequent tasks. Preadolescent learning disabled students, rewarded in a token economy for reading with high speed, subsequently produced more accurate drawings and stories than did children who had been rewarded for reading with high speed or for merely completing the reading task. In comparison, students who were rewarded for reading with high speed subsequently constructed stories more quickly than did children who had been rewarded for reading with high accuracy or for merely completing the reading task (Eisenberger et al., 1984). Such dimensional learning also applies to creative performance. Receiving reward for novel performance should increase an individual's tendency to work hard at producing novel performance. In contrast, receiving reward for familiar performance should reduce an individual's tendency to generate novel behavior.

Eisenberger and Selbst (1994) suggested that reward might influence creativity through the combined action of industriousness learning and the attention-elicitng properties of the reward. The use of a large, salient reward might eliminate the generalized effects of rewarding novel performance by attracting attention away from the task and thereby interfering with the recipient's comprehension that reward depends on creative performance. A large, salient reward may also create a strong generalized reward expectancy that would draw attention, during subsequent tasks, to the reward itself at the expense of flexible, creative performance (cf. Hennessey & Amabile, 1988).

To test this two-factor interpretation, Eisenberger and Selbst (1994) gave preadolescent school children monetary rewards for either a high degree of divergent thought or a low degree of divergent thought. Children in the high-divergent thought condition were asked to form six different words from a string of letters. This procedure was repeated several times with additional strings of letters. In the low-divergent thought condition, the children were asked to construct a single word from each string. Reward salience was manipulated by giving the children no reward, a small monetary reward, or a large monetary reward. To differentiate the incentive properties of reward from informational effects, the researchers gave all children in the study instructions and feedback concerning required task performance. To assess the generalized effects of divergent thought training and reward, the researchers presented the children with pages containing printed rows of empty circles and asked them to draw pictures by using the circles as basic elements of their drawings. The creativity of each drawing was measured by the unusualness of its subject matter compared with the drawings produced by all the children.

The results were consistent with both the operation of industriousness learning and the attention-elicitng properties of reward. A small monetary reward for high divergent thought increased the subsequent creativity of the circle drawings above that of the unrewarded children's drawings. The same small monetary reward for low divergent thought decreased the creativity of the circle drawings. These effects were eliminated by a large monetary reward.

According to the two-factor interpretation, a large reward could be effectively used to strengthen generalized creativity if presented inconspicuously. Mischel (1981) found that conditions designed to reduce the anticipation of a preferred reward's consummatory properties, such as keeping the preferred reward out of view (Mischel & Ebbesen, 1970), increased the amount of time children were willing to wait before they settled for an alternative, less preferred reward. Eisenberger and Selbst (1994) carried out a second experiment with children, all of whom received the large monetary reward used in the first study. Salience of the large reward was varied by either leaving it in front of the children following each presentation, as in the first study (salient reward), or by placing it out of sight after it was delivered (nonsalient reward). Four conditions were created from the combinations of high- versus low-divergent thought training and nonsalient versus salient reward. To test for generalized creativity, the researchers gave children the circle task used in the previous study. As in the prior study, no measurable difference was found in the drawing performance of the groups that were given a large, salient reward for a high versus low degree of divergent thinking. In accordance with the two-factor interpretation, rewarding high divergent thinking with a large, nonsalient reward produced greater generalized creativity than did rewarding low divergent thinking with the large, nonsalient reward.

Results of the two studies indicate that nonsalient reward may either enhance or diminish creative performance, depending on its manner of use. The positive effects of nonsalient reward for creative performance are consistent with learned industriousness theory and, more generally, with behavior theory's assumption that any discriminable response category, including divergent thought, can be strengthened by reward. The finding that presentations of a large, salient reward failed to increase generalized creativity follows from the views that (a) salient reward attracts attention at the expense of the recipient's comprehension that the reward depends on creative performance, and (b) salient reward creates a strong generalized reward expectancy that draws attention, during subsequent tasks, at the expense of applying cognitive resources to creative performance (cf. Hennessey & Amabile, 1988).

These findings raise several critical issues concerning the incremental effects of reward on creativity. First, to foster increased creativity in a given task in daily situations, the task presenter often must displace competing activities. For example, many preadolescent students who are asked to write an essay or paint a picture spend much of their time engaged in daydreaming, gazing out the window, talking with classmates, or other activities that interfere with sustained creative effort (Chance, 1993; Skinner, 1973). Providing nonsalient reward for
creative performance often fails to afford sufficient incentive to supplant other available activities. Even when the environment can be altered to reduce the availability of competing activities, the difficulty remains of determining a level of reward sufficient to motivate creative performance yet not so salient as to interfere with creativity. Clearly, if reward must be nonsalient to increase creative performance, the practical application of reward to promote creativity will involve complications. Therefore, on practical grounds, it is important to determine whether salient rewards can be used effectively to promote creativity.

The possibility of incremental effects of salient reward on creative performance is also of theoretical interest. Amabile (1983) and McGraw (1978) argued that salient reward reduces creativity by distracting individuals from the task and causing them to define the task in a narrow, circumscribed fashion. They cited findings that tangible reward lessens the incidental learning of information that appears to be unrelated to the task (Bahrick, Fitts, & Rankin, 1952; Johnson & Thomson, 1962; McNamara & Fisch, 1964). The only research to directly examine the effects of reward salience on creative performance, Eisenberger and Selbst's (1994) investigations of the size and spacial proximity of reward, reported findings that support the view that salient reward inhibits creativity.

According to learned industriousness theory, salient reward could be used to increase generalized creativity if individuals were not so distracted by the salient reward as to fail to discriminate this performance requirement. The requirement that one must perform creatively to obtain a salient reward is not explicitly communicated by using common divergent-thinking procedures. In many divergent-thinking tasks, novel performance is the indirect product of being required to find multiple solutions to a problem (M. Csikszentmihalyi, personal communication, November 1993). Individuals may be asked to think of various uses for common physical objects (Guilford, 1968; Runco & Okuda, 1988; Wallach & Kogan, 1965) or to form multiple words from strings of letters (Eisenberger & Selbst, 1994). In such tasks, people typically begin by generating familiar solutions, easily retrievable from memory, followed only later by novel solutions (Christensen, Guilford, & Wilson, 1957; Eisenberger & Selbst, 1994; Milgram & Rabkin, 1980; Runco, 1986; Wallach, 1988, p. 117; Ward, 1969). For example, a person who is asked to give multiple uses for a hat is likely to first state "wearing it" before providing a more novel use, such as using the hat for a flower pot. Many individuals who are given standard divergent-thinking tasks, especially if they are distracted by salient reward, may fail to identify a relationship between novel performance and reward.

The qualification that reward depends on novel performance can be made more explicit by using a divergent-thinking task that requires every response to be novel. In the present research, we required children to give unusual uses for common physical objects (Glover, 1980; Torrance, 1974; Yamamoto, 1964). We expected this explicit novelty requirement to help reward recipients understand the necessity of novel performance and focus their attention on the generation of original responses. Under these conditions, we expected the greater motivation produced by increased reward salience (i.e., a large reward) to contribute positively to creative performance. The first experiment tested the prediction that with the explicit requirement of novel performance, a large monetary reward would produce greater generalized creativity than would either the absence of reward or a small monetary reward.

A second issue relevant to findings of incremental effects of reward on creative performance is that such results tell us nothing about possible changes in the reward recipient's interest in creativity for its own sake. Much research on intrinsic interest concerns how reward influences interest in a particular activity, as determined after the reward is eliminated. Both behavioral and cognitive researchers have stressed the effects of training for one activity on the creativity with which subsequent activities are carried out (e.g., Hennessey & Amabile, 1988; Maltzman, 1960). Therefore, it is important to determine how reward for creative performance in one activity affects an individual's intrinsic creative interest involving other activities.

It follows from cognitive accounts that salient reward for novel performance should produce a generalized reward expectancy (Hennessey & Amabile, 1988), thereby reducing perceptions of self-determination (cf. Deci & Ryan, 1985) or fostering the attribution that one's own creative performance is due to the reward rather than any intrinsic interest in being creative (Greene, Sternberg, & Lepper, 1976). The resulting decrement of intrinsic creative interest should be observable as a lessened tendency to choose creative activities over uncreative activities once the expected reward for creative performance has been eliminated. A lessening of general creative interest would indicate that the use of reward to promote creative performance has harmful consequences (Condy, 1977; Tegano et al., 1991). In this circumstance, the value of a temporary increase of creative performance produced by reward would have to be weighed against the subsequent decrease of intrinsically motivated creative performance.

In contrast to the cognitive accounts, learned industriousness theory holds that reward for novel performance increases the secondary reward value of originality, whereas reward for familiar performance reduces the secondary reward value of originality. Following the elimination of reward, these differences of intrinsic creative interest should be observable as an initial generalized preference for activities involving creative thinking, as compared with activities involving uncreative thinking. The most important implication of this account, tested in the second experiment, is that the decremental effects of reward on intrinsic creative interest should be limited to cases in which uncreative performance, rather than novel performance, is rewarded.

In sum, the present research tested two implications of learned industriousness theory: (a) that making explicit the requirement of novel performance for obtaining a large monetary reward in one task should increase the subsequent creativity of performance in an entirely different task and (b) that a decremental effect of reward on intrinsic creative interest should occur with reward for uncreative performance, but not with reward for creative performance.

Experiment 1

The first experiment examined the effects of required divergent thought and reward size on the development of generalized creative thinking in fifth- and sixth-grade schoolchildren. There were six groups of children, produced by the factorial combination of two levels of required divergent thought and three levels of reward size. We used an unusual-use task during training to
explicitly require novel performance. For the high-divergent-thought condition, the children were asked to generate a novel use for each of 18 common physical objects. In the low-divergent-thought condition, the children were asked to give a usual use for each object.

The children received one of three magnitudes of monetary reward on each of 18 trials: nothing, one cent, or five cents (which corresponded with the zero-, small-, and large-reward conditions, respectively). To increase the salience of the monetary rewards, we stacked the pennies awarded at the end of each trial in the large- and small-reward conditions in plain sight next to the participant (Eisenberger & Selbst, 1994). To enable all participants, whatever their reward condition, to understand the nature of required performance, we instructed everyone verbally on the requirement to give familiar uses or novel uses, and we said “Correct” after each appropriate response.

To assess the generalized effects of creativity training and reward size, we next presented the children with a page that contained printed rows of unfilled circles and asked them to draw pictures by using the circles as basic elements in the drawings. We selected this task, which was adapted from the Torrance Test of Creative Thinking (Torrance, 1965; Yamamoto, 1964), to allow (a) an extremely broad range of originality in the subject matter of the children’s drawings and (b) the objective measurement of originality, based on the infrequency of occurrence of a drawing’s subject matter in the population of drawings constructed by a large, normative sample of children (Christensen et al., 1957; Eisenberger & Selbst, 1994; Eisenman, 1987; Punderbunk, 1977; Milgram & Rabkin, 1980; Runco, 1986; Wallach & Kogan, 1965; Ward, 1969).

Cognitive views on creativity (e.g., Condy, 1977; Hennessey & Amabile, 1988) predict less generalized creative performance following a monetary reward, especially a large monetary reward, than after verbal feedback alone. In contrast, according to learned industriousness theory, a large monetary reward for creative thought should produce greater generalized creativity than either a small monetary reward or verbal feedback alone.

Method

Participants and materials. Participants were 296 fifth- and sixth-grade students (116 boys and 180 girls) of varied socioeconomic backgrounds who attended the Bancroft and Bayard elementary schools in Wilmington, Delaware. To help ensure that every student would be able to successfully complete the training task, we required participants to have a reading level, determined by standardized tests, no more than 1 year behind their current grade level. The name of each object for which the participants were to provide a usual or novel use was printed on a 10.2 cm × 15.2 cm index card. Examples include paper clip, spoon, and rubber band. For the test task, all children received a sheet of 20.3 cm × 27.9 cm paper with 30 circles (five rows by six columns). Each circle had a diameter of 3.8 cm. To make clear to the children the need to incorporate the circles into their drawings, we filled the first circle to create a simple happy face.

Training task. The children were randomly assigned in approximately equal numbers to the six conditions. Throughout the experiment, each child was seated facing the experimenter on the opposite side of a desk. At the beginning of the low-divergent-thought task, the experimenter stated the following directions, which included a practice problem:

I am going to show you words for everyday objects. When I show you each word, read it out loud. Then tell me some use for the object. Do you understand? [Participant responded.] Okay. Here is the first word. What is this word? [Word was shown to participant, who responded.] What use might you have for a [word]? [Participant responded.]

The directions for the high-divergent-thought task were as follows:

I am going to show you words for everyday objects. When I show you each word, read it out loud. Then tell me some unusual use for the object. Here is an example. If I showed you the word “book,” you might tell me that you could use the book to hold open a door. Do you understand? [Participant responded.] Okay. Here is the first word. What is this word? [Word was shown to participant, who responded.] What unusual use might you have for a [word]? [Participant responded.]

All participants received a total of 18 names for common objects. To control for possible differences in task difficulty for the 18 objects, we presented the objects in reverse order for half the students in each group. Following the first use given by a child in the zero-reward condition, the child was told, “That’s correct.” Children in the small-reward condition were told, “That’s correct. Here’s a penny,” and the coin was placed to the side of the child within plain view. Children in the large-reward condition were told, “That’s correct. Here’s five cents,” and the five pennies were similarly placed. On subsequent trials, the monetary rewards were placed next to the monetary rewards achieved on the previous trials. If, on any trial, a child in the high-divergent-thought condition failed to state a novel use, that child was told, “Incorrect,” and no reward was presented.

Test task. After a child completed the training task, the experimenter placed the circle sheet with a happy face on it directly in front of the child and stated the following directions:

A circle should be the main part of whatever you make. Remember, make pictures from these circles. A circle should be the main part of whatever you make. Here is an example of a picture you might make. [Experimenter pointed to the happy face picture on the child’s sheet.] Do you understand? [Participant responded.]

After answering any questions, the experimenter stared at a book in her lap. Once the child completed three rows of drawings (the first 14 open circles following the happy face), the experimenter asked the child to state the subject of each picture and then wrote down the child’s answers. So that all children would experience reward for taking part in the study, we gave children in the zero-reward condition shortened usual-use task that allowed them to earn a total of 20 cents.

Results

The major finding was that, as predicted, the large reward for giving unusual uses produced much greater novel performance in the drawing task than did no reward or a small reward. To decrease the probability of falsely accepting null hypotheses, we used the following strategy: (a) We reduced error variance by controlling statistically for conditions contributing to performance that were independent of experimental manipulations (Huijtema, 1980; Kirk, 1982), and (b) we used one-tailed statistical tests to evaluate directional hypotheses (Rosenthal & Rosnow, 1985; Toothaker, 1993).

In the low-divergent-thought training condition, children failed to provide a valid use on less than 1% of the trials. In the high-divergent-thought training condition, the average number of trials on which novel uses were provided was very close to
the maximum of 18 and did not differ reliably across different magnitudes of reward, $F(2, 141) = 0.63, p = .53$. The means were 17.9, 17.7, and 17.9, respectively, for the zero-reward, small-reward, and large-reward groups.

The principal data of interest concerned the creativity of the children's drawings. To determine the originality of a given child's drawings, we had two judges independently assign each drawing a score equal to the total number of times the same topic appeared in the population of drawings produced by a large normative sample of 291 fifth- and sixth-graders obtained from one of the two elementary schools used in the present study (Eisenberger & Selbst, 1994). Drawings with a low frequency of occurrence were the more creative. Examples of infrequently used topics were lightbulbs and telescopes; examples of frequently used topics were faces, suns, and baseballs. In the rare cases in which the judges disagreed in their assignment of a child's drawing to a particular topic, the judges' scores for that drawing were averaged. Finally, each child's average originality score was obtained by adding the originality scores for all the child's drawings and dividing by 14 (the total number of the child's drawings).

The correlation between the average originality scores given to the children by the two judges was .995. For our analysis of the drawings' originality, we controlled for two influences on performance that contributed significantly to error variance and that were independent of the experimental manipulations. Specifically, each child's total numerical score on the California Test of Basic Skills was used as a covariate, and the nine different rooms in which the study was run were used as a blocking factor. The statistical assumption of an absence of an interaction of the covariate and the blocking factor with the independent variables was met handily ($ps > .35$). Using a $2 \times 3$ randomized block factorial analysis of variance (ANOVA; Kirk, 1982), we examined the effects of the degree of rewarded divergent thought (low vs. high) and amount of reward (zero, small, or large) on generalized creativity.

The average originality of each group's drawings is shown in Figure 1. For simplicity of presentation, we arranged for high scores to indicate greater originality. To do this, we took the reciprocal of the average frequency of occurrence of each group's drawings in the total population of drawings, and multiplied by 100. As predicted, the condition producing the greatest drawing creativity involved large reward for high divergent thought. Planned comparisons revealed that the large monetary reward for high divergent thought produced more-creative drawings than either no reward or a small reward for high divergent thought, $t(281) = 2.57, p < .005$, and $t(281) = 2.25, p < .025$, respectively. Further, the large reward for high divergent thought produced subsequent drawings of greater originality than did the same reward for low divergent thought, $t(281) = 3.32, p < .001$. Positive feedback without reward for high divergent thought also produced greater drawing creativity than did positive feedback without reward for low divergent thought, $t(281) = 1.70, p < .05$. In contrast, with small reward, there was only a negligible difference in the originality of drawing performance between the high-divergent-thought-trained children and the low-divergent-thought-trained children, $t(281) = -0.17$.

These results indicate that when the requirement of creative performance was made explicit, children developed greater generalized creative performance with a large reward than without reward or with a small reward. In contrast, there were no reliable systematic effects of reward for low divergent thought on generalized creativity.

**Experiment 2**

The first study suggests that a clearly discriminated contingency between novel performance and salient reward increases generalized creative performance. Consistent with behavior theory generally and with learned industriousness theory specifically, recipients of reward for high novelty in one task generalized that learning to a subsequent task. Such heightened creative performance provides no information, however, concerning the effects of reward on possible changes in intrinsic creative interest.

Cognitive interpretations predict that reward will reduce intrinsic creative interest. According to cognitive evaluation theory (Deci & Ryan, 1985), intrinsic motivation is affected by alterations in a person's perceptions of self-determination. Tangible reward for task completion should be perceived by recipients as an inherently unpleasant attempt to influence their choice of tasks and the nature of their performance. Tangible reward for novel performance should produce a generalized expectancy of reward for creativity (cf. Hennessey & Amabile, 1988), and the resulting perception of diminished self-determination should reduce the reward recipient's intrinsic interest in being creative.

The other leading cognitive interpretation of the detrimental effects of reward, the "overjustification hypothesis" (Lepper et al., 1973), makes a similar prediction. According to the overjustification hypothesis, the expectation of reward while engaging in an activity changes an individual's perception of the cause of that activity from an interest in the activity itself to an interest in the reward. Reward for novel performance should increase the individual's perception that such performance was due to the reward rather than to an intrinsic interest in creativity. As a result, intrinsic interest in creativity would decrease. Following the elimination of reward for creative performance, preference for creative activities would decrease to a level lower than that of a control group that had not been rewarded for creative performance.

Learned industriousness theory, in contrast, assumes that the
secondary reward value of creativity is enhanced by reward for creative performance, whereas the secondary reward value of familiar performance is increased by reward for uncreative performance. Therefore, rewarding creativity should result in an initial increase in intrinsic creative interest. It is only when uncreative performance is required that reward should decrease intrinsic creative interest.

In a typical study used to assess the effects of reward on intrinsic task interest, a group of experimental participants is asked to carry out an activity for which they receive money, candy, gold stars, or the like. A control group engages in the activity without reward. Both groups are then observed during a nonreward period in which the participants are free to continue performing the task or to engage in some alternative activity. The time participants spend carrying out the activity during this period (called “free time on the task”) and their expressed attitudes toward the activity are used to measure intrinsic interest. If rewarded participants spend less free time on the activity or express less task interest than nonrewarded participants, the receipt of reward is said to undermine intrinsic motivation (see reviews by Cameron & Pierce, 1994; Dickinson, 1989; Eisenberger & Cameron, 1996; Flora, 1990).

Several methodological problems are characteristic of typical intrinsic-interest procedures. Because rewarding an activity can create a persisting expectancy of reward, individuals may continue their heightened performance of a task after the reward has been withdrawn. This high level of performance, due to the continued reward expectancy, may be misidentified as an increase in intrinsic interest that resulted from the original reward. On the other hand, if the withdrawal of reward is carried out so that it becomes clear to the experimental participant that no additional reward will be presented, temporary aversive motivational and emotional reactions may be mistaken for a decrease in intrinsic interest (Balsam & Bondy, 1983; Bandura, 1986; Feingold & Mahoney, 1975; Flora, 1990). For example, the withdrawal of reward for an activity commonly produces a “negative behavioral contrast effect” in animals and humans involving a temporary decline of performance to a level below that which existed before reward (Daly, 1969; Dunham, 1968).

To lessen these interpretive difficulties, we considered how we might evaluate the effects of rewarded creative performance on subsequent creative interest without reducing reward. We accomplished this by rewarding different groups of children for either creative performance or uncreative performance in one task; we followed this with a second task in which all children chose repeatedly between rewarded creative performance and rewarded uncreative performance. Changes in intrinsic creative interest that had resulted from rewarded creative versus uncreative performance in the training task were identified by the participants’ subsequent choice of rewarded creative performance over rewarded uncreative performance.

There were four groups of children, produced by the factorial combination during training of two levels of required divergent thought (usual vs. novel uses) and the presence or absence of the same large monetary reward used in the first experiment. All other details of training were the same as in Experiment 1. The cognitive accounts predicted that among participants given high-divergent-thought training, those receiving reward would show a diminished subsequent preference for making creative drawings. Learned industriousness theory, in contrast, predicted that (a) among participants given high-divergent-thought training, those receiving reward would show a greater subsequent preference for the creative activity, and (b) among participants given low-divergent-thought training, those receiving reward would show a diminished subsequent preference for the creative activity.

Method

Participants were 120 fifth- and sixth-grade students (54 boys and 66 girls) of varied socioeconomic background attending Bayard Elementary School in Wilmington, Delaware. As in Experiment 1, no participant’s reading level, based on standardized tests, was more than 1 year behind his or her current grade level. The children were randomly assigned to the four groups. These groups received precisely the same training procedures as the comparable groups in Experiment 1.

In the test phase, all students were given a series of choices between copying the drawing of a happy face or constructing their own drawing. After a child completed the training task, the experimenter placed a booklet consisting of 16 stapled pages directly in front of the child. Each 27.5 cm x 21.3 cm page contained a pair of printed circles, 3.52 cm in diameter, centered between the top and bottom of the page. One circle’s center was 6.5 cm, and the other 15.5 cm, from the left of the page. The left circle contained a drawing of a happy face. The experimenter stated the following directions:

Now I am going to have you make pictures out of circles. The circle should be the main part of whatever you make. Here is an example of a picture you might make. [Experimenter pointed to the happy face picture on the first page of the child’s booklet.] You can either draw a picture of a face or draw a different picture. It’s up to you. Either way you get five cents. If you draw a face, you get five cents. Or if you draw a different picture, you also get five cents. You will be able to choose several times. Do you have any questions?

After answering any questions, the experimenter said, “Now make your first choice. Either draw a face or draw a different picture.” After copying the happy face or composing an original drawing, the child was told, “Here’s five cents.” and the five pennies were placed to the side of the child within plain view. The experimenter turned the page following the completion of each drawing and rewarded the child for either choice, placing the monetary rewards next to the money received on previous trials. This procedure was continued until the child completed 16 drawings.

Results

The major findings were that (a) reward for creative performance increased the subsequent choice to produce original drawings over copying a familiar drawing, and (b) reward for uncreative performance increased the subsequent choice to copy the familiar drawing. During training, among children required to give usual uses, the number of trials on which any failed to provide a valid usual use was less than 1%. Among children required to provide novel uses, the average number of trials on which novel uses were provided was very close to the maximum of 18 and did not differ reliably for rewarded versus unrewarded children; the respective means were 17.8 and 17.7, F(1, 57) = 0.69, p = .41.

The main measure of test performance was the number of times a student chose to produce novel drawings over copying
the familiar drawing. Figure 2 shows the average number of novel choices by each group of students. We had planned to use each student's numerical score on the California Test of Basic Skills as a covariate for individual differences in preference for novelty; however, a test of assumption of analysis of covariance that the regression slopes are homogeneous revealed an interaction between the potential covariate and high-versus low-divergent-thought training that approached statistical significance (p < .11). Kirk (1982) recommended the conservative procedure of rejecting the use of analysis of covariance if this probability is less than .25. Therefore, we dispensed with the use of the covariate and instead carried out a 2 x 2 completely randomized factorial ANOVA to examine the effects of required divergent thought (low vs. high) and reward (nothing vs. five cents) on the subsequent number of choices to produce a novel drawing.

A focused test for the interaction between the degree of required divergent thought and the amount of reward revealed, as predicted, stronger effects of low-versus high-required-divergent-thought training when accompanied by reward than without reward, t(116) = 8.81, p < .001. As illustrated by the filled bars in Figure 2, a planned comparison revealed that required high divergent thinking with reward produced a greater subsequent number of novel choices than did required high divergent thinking in the absence of reward, t(116) = 1.70, p < .05. Further, as illustrated by the open bars, required low divergent thinking with reward produced fewer novel choices than did required low divergent thinking without reward, t(116) = 2.89, p < .005.

We also assessed the originality of the set of drawings produced by each child. Because the test task was substantially different from the previously used drawing task, the population of drawings generated in the present study was used to calculate the originality of each child's drawings. Two judges' examination of the subject matter of all the children's drawings produced a total of 237 different topics. The judges tabulated the number of times each topic was represented in the population of drawings. As in Experiment 1, the two judges independently assigned each drawing a score equal to the total number of times the same topic appeared in the population of drawings. The correlation between the average originality scores given to the children by the two judges was .98.

The average originality of each group's drawings in the total population of drawings is shown in Figure 3. The 2 x 2 completely randomized factorial ANOVA examined the effects of required divergent thought (low vs. high) and reward (nothing vs. five cents) on the originality of the children's drawings. The average originality of each group's drawings is shown in Figure 3. For simplicity of presentation, as in Experiment 1, high scores reflect greater originality. The scores were computed by taking the reciprocal of the average frequency of occurrence of each group's drawings in the total population of drawings, and multiplying by 100. A focused test for the interaction between the degree of rewarded divergent thought and the amount of reward revealed, as predicted, stronger effects of low-versus high-divergent-thought training when accompanied by reward than without reward, t(116) = 9.03, p < .001. As illustrated by the filled bars in Figure 3, a planned comparison revealed that required high divergent thinking with reward produced greater subsequent originality of the children's drawings than did required high divergent thinking without reward, t(116) = 1.73, p < .05. Further, as illustrated by the open bars, required low divergent thinking with reward produced less originality of the drawings than did required low divergent thinking without reward, t(116) = 3.03, p < .005.

These results indicate that the decremental effect of reward on intrinsic creative interest was limited to the reward of uncreative performance. Rewarding a low degree of divergent thinking did substantially reduce the children's preference for drawing novel pictures over drawing familiar pictures. However, rewarding a high degree of divergent thinking increased the children's choice to draw novel pictures. Similar differences were present in the originality of the set of drawings produced by each child: Rewarding children for giving novel uses for physical objects increased the subsequent unusualness of their drawings, whereas rewarding children for giving common uses for physical objects decreased the unusualness of their drawings.

General Discussion

The present findings indicate that the explicit requirement of novel performance for salient reward enhances generalized creative performance without any loss of intrinsic creative interest. In Experiment 1, the specific requirement of novel perfor-
mance in one task (generating uses for physical objects) produced greater subsequent creative performance in an entirely different task (picture drawing) when a large reward, rather than either no reward or a small reward, was used. In Experiment 2, salient reward for novel performance increased subsequent intrinsic creative interest, demonstrated by the choice to produce original drawings over copying a familiar drawing. Such intrinsic creative interest was reduced only by reward for uncreative performance.

The incremental effects of salient reward on creative performance support the assumption of behavior theory that any discriminable response category, including divergent thought, can be effectively strengthened by systematic reward (cf. Maltzman, 1960; Pryor et al., 1969; Skinner, 1953; Torrance, 1970; Winston & Baker, 1983). According to learned industriousness theory (Eisenberger, 1992), individuals learn which dimensions of performance are rewarded and then generalize rewarded high effort more to these performance dimensions than to other dimensions in subsequent tasks. Present findings show that just as the generalized tendencies to act accurately or quickly can be strengthened by reward for accuracy or speed (Eisenberger et al., 1984), so the generalized tendency to act creatively can be increased by reward for divergent thinking. The results are also consistent with cognitive approaches that emphasize the importance of task-focused motivation for producing creative performance (Csikszentmihalyi, 1990; Sternberg & Lubart, 1991).

We increased reward salience by repeatedly placing the large, tangible reward in plain view of the recipients. The incremental effect of salient reward on divergent thinking contradicts the conventional view that salient reward inherently causes recipients to define the task uncreatively (e.g., Amabile & Cheek, 1988, p. 60; Schwartz, 1982) and to pay attention to the reward at the expense of flexible, creative performance (e.g., Amabile, 1983; McGraw, 1978). The present research indicates that explicit reward for novel performance causes individuals to define the task as requiring flexible, creative responding rather than simple, repetitive responding. When individuals are specifically reinforced for divergent thinking, they do not engage in stereotyped repetition of a particular response but increase their production of original responses.

Eisenberger and Selbst (1994) previously found an incremental effect of nonsalient reward on generalized creativity but failed to obtain such an effect with salient reward. The type of divergent-thinking task used by Eisenberger and Selbst and other investigators (e.g., Guilford, 1968; Runco & Okuda, 1988; Wallach & Kogan, 1965) produces creative performance indirectly by requiring participants to give multiple solutions to a problem (M. Csikszentmihalyi, personal communication, November 1993). In such tasks, individuals typically begin by generating familiar solutions and then gradually increase their novel responses as the set of familiar solutions begins to become depleted (Christensen et al., 1957; Eisenberger & Selbst, 1994; Milgram & Rabkin, 1980; Runco, 1986; Wallach, 1988; Ward, 1969). The increase in novel responding is thus a by-product of the diminishing availability of familiar responses. Because initial responses are usually uncreative, and novel responding occurs more frequently after uncreative responses, many participants undergoing such divergent-thought training may fail to identify the relationship between novel performance and reward.

To make explicit the necessity of novel performance, the high-divergent-thought task used in the present experiments (giving novel uses for physical objects) was designed to require that every response be novel (see, e.g., Guilford, 1968; Runco & Okuda, 1988; Wallach & Kogan, 1965). When there was a readily discriminable contingency between novel performance and reward, generalized creativity was greater with large reward than with small reward. Moreover, we found in both experiments that large reward for required high divergent thinking produced greater generalized creative performance than either (a) large reward for required low divergent thinking or (b) required high divergent thinking without reward. Understanding explicitly the relationship between novel performance and reward evidently allows individuals to concentrate on being creative. Under these circumstances, salient reward operates as a motivator rather than as a distraction, so that a large reward more effectively promotes creativity than either the absence of reward or a small reward.

A decremental effect of reward on intrinsic creative interest occurred with reward for uncreative performance, but not with reward for creative performance. Salient reward for novel performance increased generalized intrinsic creative interest. Specifically, preference for producing novel drawings over copying a familiar drawing was greater among children previously rewarded for high creative performance in the unusual-use task. This result is consistent with learned industriousness theory, which holds that rewarding divergent thinking enhances creativity's secondary reward value.

The results contradict the view that any increase in performance that is due to salient reward produces a countervailing decrease in intrinsic creative interest (e.g., Condry, 1977; Hennessey & Amabile, 1988). According to the overjustification hypothesis (Lepper et al., 1973), expecting reward for creative thinking would change the perceived cause of one's own creative performance from an interest in creativity to an interest in the reward. In Experiment 1, precisely the opposite effect occurred; salient reward for novel performance produced an increase in intrinsic creative interest. The intrinsic-interest findings are also inconsistent with cognitive evaluation theory (Deci & Ryan, 1985), according to which salient reward for task completion would be perceived by recipients as a form of inherently unpleasant social pressure that reduces intrinsic interest.

Experiment 2 incorporated methodology designed to deal with interpretative problems characteristic of studies that examine the relationship between reward and intrinsic interest. Rewarding an activity can create an expectancy of reward that persists, resulting in heightened performance for some time following the reward's withdrawal. Alternatively, if the withdrawal of reward is carried out in a way that suddenly undermines reward expectancies, aversive emotional reactions can produce a temporary decrease in performance that may be mistaken for weakened intrinsic interest (cf. Balsam & Bondy, 1983; Bandura, 1986; Eisenberger & Cameron, 1996; Feingold & Mahoney, 1975; Flora, 1990). We addressed this problem with a test of intrinsic creative interest in which participants chose between rewarded creative performance and rewarded uncreative performance. This procedure allowed the reward expectancies for creative performance and uncreative performance to be equated in the test situation with no reduction of reward from the previously expected level. We found that reward for divergent thinking increased intrinsic creative interest, rather than decreasing
intrinsic creative interest, as would have been predicted by the
overjustification hypothesis and cognitive evaluation theory.

The present research and related research (Eisenberger &
Selbst, 1994) indicate that the effects of reward on creativity
depend on how the reward is administered. Whether reward
substantially increases creativity, has little effect, or substan-
tially decreases creativity evidently depends on (a) the degree
of creativity required for reward, (b) the explicitness of this
contingency, and (c) the size and salience of the reward. The
present findings show that repeated presentation of a salient
reward, explicitly contingent on creative performance, produces
a high degree of generalized creative performance. A decrement
of creative performance may be produced when reward is pro-
vided repeatedly for very simple, uncreative performance (Ei-
senberger & Selbst, 1994, Experiment 1) or for the repeated
application of an elementary response rule (McGraw & McCul-
lers, 1979; Schwartz, 1982). According to learned industri-
ousness theory, reward for a low degree of cognitive per-
formance should increase the secondary reward value of low
cognitive effort, lessen the secondary reward value of high cog-
nitive effort, and extinguish any prior discrimination that cre-
ative performance is required for reward. As a result, reward
for minimal cognitive performance should produce a generalized
decrement of creativity.

Many investigators hypothesize that the expectancy of re-
ward, however induced, lessens creativity (e.g., Amabile &
Cheek, 1988; Schwartz, 1982). These researchers often dispense
with the repeated performance-contingent presentation of re-
ward; to elicit the reward expectancy, reward is simply promised
(e.g., Amabile, 1982; Loveland & Olley, 1979) or given before
required performance (e.g., Amabile et al., 1986). The present
findings question the assumption that the expectancy of reward
generally reduces creativity. The repeated presentation of tangi-
bile reward contingent on creative performance should strengthen
the expectancy of reward beyond that produced simply by a
promise. Repeated presentation of reward contingent on novel
performance acted to increase, rather than decrease, generalized
creativity.

A verbal promise of reward that incorporates an explicitly
stated requirement of creative performance has not been exam-
ined by cognitive researchers. Reward is typically promised
without reference to the nature of required performance. Exper-
imental participants are left uncertain about which aspects of
performance may be required for reward. For example, an exper-
imental participant who is promised a monetary payment for
drawing a picture without any specifically stated performance
requirement will not know whether reward depends on task
completion, speed, accuracy, creativity, or another dimension of
performance. Under such circumstances, performance may be
strongly influenced by the individual's history of reward in simi-
lar contexts and may not accurately reflect the performance
that would have been produced by repeated reward for novel
performance (cf. Dickinson, 1989; Eisenberger & Selbst, 1994;
Flora, 1990; Malouf, 1983; Reiss & Sushinsky, 1975, 1976;
Skinner, 1953; Workman & Williams, 1980).

The present findings and others we have reviewed show that
differing kinds of rewarded performance, such as speed, accu-
W.

References

Amabile, T. M. (1982). Children's artistic creativity: Detrimental effects
of competition in a field setting. Personality and Social Psychology
Bulletin, 8, 573–578.

Amabile, T. M. (1983). The social psychology of creativity. New York:
Springer-Verlag.


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