

Incremental Effects of Reward on Creativity

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The authors examined 2 ways reward might increase creativity. First, reward contingent on creativity might increase extrinsic motivation. Studies 1 and 2 found that repeatedly giving preadolescent students reward for creative performance in 1 task increased their creativity in subsequent tasks. Study 3 reported that reward promised for creativity increased college students' creative task performance. Second, expected reward for high performance might increase creativity by enhancing perceived self-determination and, therefore, intrinsic task interest. Study 4 found that employees' intrinsic job interest mediated a positive relationship between expected reward for high performance and creative suggestions offered at work. Study 5 found that employees' perceived self-determination mediated a positive relationship between expected reward for high performance and the creativity of anonymous suggestions for helping the organization.

Creativity is widely prized in education and business. Being able to approach new academic assignments flexibly and innovatively helps make students active, self-directed learners (Torrance, 1965). For employees, innovation can help meet the added responsibilities imposed by downsizing and global competition (James, Clark, & Cropanzano, 1999). To promote creativity, educators and employers often use rewards. For example, students may be given high grades for creative essays or art projects. Employees may be offered financial inducements for suggesting new ways to increase productivity or reduce costs (Edwards, 1989; Nelson, 1994). However, reward's effectiveness in increasing creativity has been challenged by academic researchers.

On the basis of a review of the research literature, Kohn (1993) concluded that "it is simply not possible to bribe people to be creative" (p. 294) and suggested that schools and businesses stop using rewards as inducements for creativity. A primer for teachers on promoting classroom creativity contained the heading "How to Kill Creativity," with the message that an expected reward makes students "much less likely to take risks or to approach a task with a playful or experimental attitude" (Tegano, Moran, & Sawyers, 1991). Hennessey and Amabile (1998b) concluded that "the preponderance of the evidence demonstrates that working for reward, under circumstances that are likely to occur naturally in classrooms and workplaces every day, can be damaging to both intrinsic interest and creativity" (p. 675).

Reward's relationship to creativity has important theoretical as well as practical implications. Interest in activities for their own sake (*intrinsic task interest* or *intrinsic motivation*) is generally viewed as strongly related to creativity (Mumford, in press). Researchers have argued that the motivation to obtain external rewards for carrying out a task (*extrinsic motivation*) lessens intrinsic task interest and thereby reduces creativity (Amabile, 1983;

Deci & Ryan, 1985). Thus, contemporary motivational theory and supportive empirical evidence seem to indicate that reward's naturally occurring use lessens creativity.

The conclusion that reward generally decreases creativity could be premature. Studies reporting decremental effects of reward on creativity used procedures that may convey the dependence of reward on conventional rather than creative performance. We report a series of studies with preadolescent students, college students, and employees examining two ways reward might increase creativity. First, reward that is specifically contingent on creativity might increase the extrinsic motivation for being creative. Second, reward for high performance in general might increase creativity by enhancing perceived self-determination and, therefore, intrinsic task interest.

The Reward–Creativity Controversy

The great majority of empirical studies concerning the effects of reward on creativity have evaluated divergent thinking, an important component of creative performance involving the production of varied responses to a problem or question that has multiple alternative solutions (Guilford, 1968; Runco, 1991). Many studies carried out by behaviorally oriented researchers have reported incremental effects of reward on novel performance. For example, Glover and Gary (1976) found that the variety of uses school children gave for common objects was increased by repeated reward for novelty. These approaches take a utilitarian view of human nature favored by the British philosopher Jeremy Bentham (1781/1988), which holds that behavior is augmented by extrinsic motivation. In this view, any discriminable response class, including novel performance, can be strengthened by reward (e.g., Pryor, 1985; Skinner, 1953; Winston & Baker, 1985).

Studies based on the utilitarian approach have confounded the use of reward with cues indicating the desirability of novel performance (see Winston & Baker, 1985). Rewarded participants were told in advance that they would receive a reward for novelty or had this contingency pointed out to them each time a reward was presented. By contrast, participants in the control condition received no information concerning the appropriateness of novel

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performance. Because asking people to be creative can raise their creativity levels (Amabile, 1979; O'Hara & Sternberg, 2000; Shalley, 1991), the greater novelty of performance in the experimental condition than in the control condition might have been due entirely to cues indicating the appropriateness of novel performance, without any contribution of reward's incentive properties (Amabile, 1983; Winston & Baker, 1985). Even without explicit instructions to be creative, the repeated receipt of reward for creative performance may convey the creative nature of the task (Eisenberger & Selbst, 1994; Stokes, 1999b). Therefore, it is important to distinguish extrinsic motivation from the effects of information alone.

Many cognitive investigators argue that the expectancy of reward, however induced, should lessen creativity (e.g., Amabile & Cheek, 1988; Schwartz, 1982). Hennessey and Amabile (1998a) stated that "the expectation of reward can actually undermine intrinsic motivation and creativity of performance" (p. 11). In place of the behavioral studies' repeated presentation of rewards, cognitively oriented researchers often use the stated promise of reward as a simple and convenient way to establish a reward expectancy. The confound in behavioral studies between reward and cues indicating creativity's desirability has been eliminated by cognitively oriented researchers who promised participants reward on a single occasion without any indication that creativity was preferable. For example, Kruglanski, Friedman, and Zeevi (1971) asked college students to list possible titles for a paragraph, with no instruction concerning the type of titles that would be appropriate. Students who were promised a reward produced less-creative titles, as assessed by judges, than did students who were not promised a reward. Similar decremental effects of expected reward for unspecified performance on creativity have been reported in many studies, leading cognitive researchers to the conclusion that expected reward reduces creativity (e.g., Amabile, 1983; Collins & Amabile, 1999; Condry, 1977; Tegano et al., 1991).

Amabile (1983) and Deci and Ryan (1985) interpreted these findings as indicating that extrinsic motivation lessens creativity by reducing intrinsic task interest. Collins and Amabile (1999) conceded that reward might increase creativity under limited circumstances but argued that decremental effects are more common. According to Collins and Amabile, decremental effects of reward on children's creativity can be ameliorated only by intensive cognitive training designed to encourage a focus on the assigned task rather than on the reward. Among adults, they suggested, rewards might motivate information search and other tedious procedures necessary to bring long-term creative projects to fruition. However, expected reward was assumed to interfere with the generation of creative responses: "When individuals are attempting to solve a problem or generate possible solutions, being intrinsically involved in the task and not distracted by extrinsic concerns will help them to produce more original ideas" (Collins & Amabile, 1999, p. 305).

Findings of decremental reward effects produced by the promise of reward for unspecified performance have not resolved the issue of whether reward can be used to increase creativity. The effects of promising reward for unspecified performance, as used by cognitive researchers, might differ from the effects of making reward specifically contingent on creativity. Thus, neither the procedures used by utilitarian researchers nor those used by cognitively ori-

ented researchers provide clear evidence concerning whether reward as used in everyday life increases creativity. Eisenberger and Selbst (1994) initiated a series of studies evaluating the effects of different reward contingencies on creativity. To eliminate the confound present in utilitarian-oriented studies between reward and information concerning the nature of appropriate performance, control groups as well as rewarded groups received information regarding the desirability of creativity.

Expected Reward for Novel Performance

According to learned industriousness theory (Eisenberger, 1992), when individuals are rewarded for carrying out a task, they learn which dimensions of performance are appropriate. The expectancy that a particular type of performance will produce reward provides the motivation to perform as required. If a task lacks information concerning appropriate performance, individuals generalize from previous experience. Thus, rewarding response speed and accuracy in one task has been found to increase these aspects of performance in subsequent, unrewarded tasks (Eisenberger, Mitchell, McDermitt, & Masterson, 1984).

Consistent with this view, reward for simple, conventional performance in one task has been found to produce simple, uncreative performance in later tasks (Eisenberger & Armeli, 1997; Eisenberger & Selbst, 1994; McGraw & McCullers, 1979). In contrast, rewarding school children's novel performance in one task (generation of multiple words from strings of letters or generation of creative uses for common physical objects) increases the novelty of performance in a subsequent, unrewarded drawing task (Eisenberger & Armeli, 1997; Eisenberger & Selbst, 1994). Thus, whether reward increases or decreases creativity may depend on individuals' belief that creative or conventional performance is required for reward.

In everyday life, reward is given more often for conventional than for creative performance. Individuals may therefore learn to perform conventionally in the absence of cues indicating the desirability of creativity. When people are given a new task without clarification concerning appropriate performance, they may generalize their knowledge that conventional performance is usually appropriate (Eisenberger & Cameron, 1996). For example, Amabile (1982) found that when children were offered a reward for constructing a collage, without any indication that creative performance was desirable, the children constructed collages that were judged less creative, though better planned and organized, and more representational than were the collages produced by a control group who did not receive the promise of reward. Lacking cues that creative performance was preferable, the children may have generalized their everyday knowledge that reward is commonly given for conventional performance.

On the basis of learned industriousness theory, reward should increase creative performance if current task instructions or past experience indicate the appropriateness of creativity. Eisenberger, Armeli, and Pretz (1998) found that children who were promised a reward for novel drawings drew pictures that were more novel than did children who were asked to produce novel drawings without reward or children who were promised a reward for unspecified drawing performance. Concerning past experience, Eisenberger et al. (1998) and Eisenberger, Haskins, and Gambleton (1999) asked different groups of children to state usual uses or

creative uses for common objects. Next, the children were given a drawing task with or without the promise of reward for unspecified performance. The nonspecific promise of reward resulted in greater drawing novelty by children who had previously generated creative object uses than by children who had generated common object uses or children who had not received the object-use task. Eisenberger and Cameron (1996, 1998) interpreted such findings to indicate that reward enhances creativity whenever recipients construe a positive relationship between creativity and reward.

Can Rewards Increase Creativity in Addition to Novelty?

Creative performance involves novelty combined with quality or utility (Stokes, 1999b). Students of creativity have emphasized humans' ability not only to generate novel responses but to evaluate which novel responses best fit the requirements of a problem or practical application. Because the assessment of creativity involves subjective judgment (Amabile, 1996), behaviorally oriented studies have generally focused on quantifiable measures of performance variability or novelty rather than fully assessing creativity (Eisenberger & Cameron, 1998; Stokes, 1999b, in press). Reward for variable performance has been found to increase the variability of sequences of responses (Neuringer, 1986, 1993; Page & Neuringer, 1985; Stokes, 1995, 1999a), and reward for novelty has been found to increase novel performance (Eisenberger & Armeli, 1997, 1998; Eisenberger, Haskins, & Gambleton, 1999; Eisenberger & Selbst, 1994).

Hennessey and Amabile (1998a) and Amabile (1996) maintained that whatever reward's effects on novelty, reward used in naturally occurring ways reduces creativity. Indeed, rewarding novelty might facilitate the generation of novel responses while interfering with the complex mental operations required for creativity. Amabile conceptualized creativity as a unidimensional product of human endeavor that should be assessed by a global judgment. Amabile (1982) stated that "in accord with previous theorists (e.g., Simon, 1967), I propose that there is one basic form of creativity, one basic quality of products that observers are responding to when they call something 'creative,' whether they are working in science or the arts" (p. 32; see also Hennessey & Amabile, 1988, p. 15). Amabile (1996) emphasized the need to assess creativity consensually, wherein "a product or response is creative to the extent that appropriate observers independently agree it is creative" (p. 33). Consistent with this conceptual approach, Amabile's conclusions concerning the effects of rewards and other variables on creativity were based on the global judgment of creativity involving the combined assessments of independent judges (Amabile, Goldfarb, & Brackfield, 1990; Conti, Amabile, & Pollak, 1995; Hennessey, Amabile, & Martinage, 1989; Ruscio, Whitney, & Amabile, 1998).

Whether reward can be used to increase creativity in addition to novelty has basic theoretical implications. Hennessey and Amabile (1988) assumed that extrinsic motivation interferes with creative performance by reducing intrinsic task interest. By contrast, learned industriousness theory (Eisenberger, 1992) assumes that the expectation of reward can increase performance in any discriminable performance dimension, including creativity. According to learned industriousness theory, reward should increase creativity if a positive relationship between creativity and reward is conveyed either by prior experience or by current instructions.

Because reward is widely used in everyday life as an inducement to creativity, the relationship between reward and creativity has practical as well as theoretical significance. Therefore, in the present research, Studies 1–3 examine the effects of reward explicitly for creative performance, using Amabile's (1996) consensual validation technique for assessing creativity.

The first two studies, with preadolescent students, evaluate the generalized effects of repeated reward for creative performance in one task (generating creative uses for common objects) on preadolescent students' subsequent creativity in different, unrewarded tasks. In Study 1, the test task used by judges to assess creativity allowed children to construct as many titles as they wished for a movie about a specified topic. In Study 2, the test task required children to generate a fixed number of titles for each of two short stories. Whereas these two studies used the typical utilitarian procedure of repeated reward presentations, Study 3 used the usual cognitively oriented procedure of promising reward on a single occasion. College students were asked to produce creative titles for a short story with or without the promise of reward. These three studies provide evidence as to whether reward given specifically for creative performance increases creativity.

Rewards, Intrinsic Task Interest, and Creativity

In addition to individuals' tendency to increase either creative or conventional performance depending on which kind of performance they expect to be rewarded for, reward may alter creativity through intrinsic task interest. Contemporary psychological views stressing the contribution of intrinsic task interest to creativity are rooted in philosophical romanticism. Cultural historian Jacques Barzun (2000) decried the unfortunate linguistic confusion between the use of the term *romanticism* to designate the historically important worldview and the popular contemporary usage that sometimes connotes a starry-eyed naivete. Barzun nevertheless recommended continued use of the word because no other term designates the assemblage of ideas that has had such a profound effect on Western culture. To be clear, we do not use the term *romanticism* in the pejorative sense of being overly sentimental. Quite the contrary, we believe that philosophical romanticism provides fundamental insights concerning the contribution of perceived self-determination to intrinsic task interest and creativity.

Jean-Jacques Rousseau (1712–1778) assumed that every individual has unique talents and interests that must be carefully nurtured to produce self-fulfillment. Rousseau (1762/1974, 1782/1995) argued that perceived limitations concerning whether, when, or how people carry out tasks interfere with the spontaneity required for creativity. The romantic philosophers' emphasis on perceived self-determination strongly influenced the Western cultural view that freedom from societal constraints contributes to creativity (Geller, 1982; Hergenbahn, 1997; Hogan, 1975), as illustrated in the writings of such humanist psychologists as Carl Rogers (1954) and Abraham Maslow (1968) and by contemporary students of creativity.

Rogers (1954) argued that creativity arises from individuals' voluntary exploration of personal aptitudes and interests: "We must face the fact that the individual creates primarily because it is satisfying to him, because this behavior is felt to be self-actualizing" (p. 252). For Rogers, one promotes creativity by eliminating perceived constraints on freedom and by encouraging

spontaneity. Amabile (1983; Collins & Amabile, 1999) similarly viewed perceived freedom from external constraints as conducive to intrinsic interest and, therefore, creativity, and she identified reward as a perceived constraint that reduces creativity. Deci and Ryan's (1985) cognitive evaluation theory supposes that intrinsic task interest is promoted by perceptions of self-determination; external restrictions on behavior, including expected reward, reduce perceived self-determination and, therefore, lessen intrinsic task interest and creativity.

Consistent with these accounts, intrinsic task interest is often found to be positively related to creativity (Mumford, in press). However, contrary to the views of Collins and Amabile (1999) and Deci and Ryan (1985), there is evidence that expected reward for high performance can heighten intrinsic task interest by increasing the value placed on competence (Harackiewicz & Sansone, 1991) and by strengthening perceived self-determination (Eisenberger, Rhoades, & Cameron, 1999). Such incremental effects of reward for high effort on intrinsic task interest might increase creativity.

Among employees, intrinsic job interest may contribute both to conventional and to creative task performance. Unlike typical research procedures that examine the relationship between reward and creativity in a single task, rendering conventional and creative performance mutually incompatible, employees engage in multiple, concurrent job activities. Organizations may encourage conventional performance in some activities and creative performance in others. Increased intrinsic job interest, resulting from expected reward for high performance, might enhance conventional performance in tasks requiring conventionality and enhance creative performance in tasks requiring creativity.

Despite the widespread view that extrinsic motivation reduces creativity through lessened intrinsic task interest, no previous study has assessed the mediating role of intrinsic task interest in the relationship between expected reward and creativity. In Study 4, therefore, we examine our prediction that intrinsic job interest would mediate a positive relationship between employees' expectation of reward for high performance and their creative suggestions, offered at work, for improving the organization's operations.

Eisenberger, Rhoades, and Cameron (1999) suggested that people recognize that reward's use in everyday life is utilitarian, involving the reward giver's lack of control over the recipient: The agent providing the reward usually does so on the basis of the belief that favorable consequences are needed to obtain the cooperation of the potential reward recipient. Therefore, the promise of reward for high performance would convey that (a) the person, group, or organization offering the reward lacks control over the potential reward recipient's performance, and (b) the potential reward recipient has the opportunity to decline the reward and not act as requested. Therefore, the offer of reward for high performance should increase perceived self-determination. Eisenberger, Rhoades, and Cameron (1999) found that perceived self-determination mediated a positive relationship between employees' expectancy of reward for high performance and their performance of standard job activities. Study 5 addresses the contribution of employees' perceived self-determination to the relationship between expected reward for high performance and the creativity of their anonymous suggestions to aid the organization.

Studies 1 and 2: Generalized Effects of Rewarded Creativity

The first 2 studies evaluate the effects of reward for creative performance involving one task on preadolescent school children's subsequent creative performance on a new task. As pointed out by Amabile (1983, p. 127) and others (Eisenberger & Selbst, 1994; Stokes, 1999b; Winston & Baker, 1985), incremental effects of repeated reward presentations on creativity might be due simply to cues that accompany reward, without any contribution of reward's incentive properties. Preliminary instructions, performance feedback, or simply the circumstances under which reward is presented may convey the creative nature of the task. Thus, in the initial task we gave both the rewarded group and a treatment control group performance feedback indicating the desirability of creative performance. We also included a no-treatment control group to determine whether reward increases generalized creativity beyond the creativity that occurs in the absence of training.

Some experimental tests of creative performance have involved asking participants to generate a fixed number of responses, whereas other studies have allowed participants more control over the number of responses. To assess the generality of the effects of reward for high creativity, we carried out studies using both procedures. In Study 1, the test task involved giving titles for a movie about a student's summer vacation, with the number of titles determined by each child. According to learned industriousness theory (Eisenberger, 1992), individuals should learn in the first task that reward depends on the creativity of their individual responses. This learning should generalize to the second task, in which children should produce more highly creative movie titles. The theory makes no predictions concerning the effects of reward for high creativity on alternative dimensions of performance, such as the number of titles produced.

In the second study, the test task involved inventing a fixed number of titles for each of two short stories. The first short story was an anthropomorphic fantasy about the experiences of a popcorn kernel as it was being popped. The second story involved an imagery-rich description of a snowy night. Three undergraduate research assistants who were not informed of participants' experimental condition evaluated the creativity of the children's responses in the first study, and three other undergraduates did the same in the second study.

Method

Participants and Materials

Participants in Study 1 were 72 fifth- and sixth-grade students of varied socioeconomic backgrounds attending the Bancroft Elementary School in Wilmington, Delaware. Participants in Study 2 were 97 fifth graders attending the same school. To help ensure that every student would successfully complete the training task, we required that participants have a reading level, as determined by standardized tests, no more than 1 year behind their current grade level. The items used in the initial creativity-training task, such as paperclip, spoon, and rubber band, were selected for having standard uses that are well-known to children. The name of each object for which the students were to provide a conventional or creative use was printed on a 10.2 cm × 15.2 cm index card.

To examine generalized creativity, we presented all children in the first study with a pencil and a 20.3 cm × 27.9 cm paper containing the instruction, "Please make up some names for a movie about a student's

summer vacation," followed by 16 horizontal lines. In the second study, students received a 20.3 cm × 27.9 cm sheet of paper containing the popcorn short story (adapted from Seyba, 1984), with the instruction, "Please list five possible titles for this story," followed by 5 horizontal lines. A second sheet contained the snowy night short story (also adapted from Seyba, 1984), with corresponding instructions.

The popcorn short story was as follows:

You are a tiny golden kernel of popcorn lying in the bottom of a frying pan. Look around you and see the other popcorn kernels that are snuggled up close to each other. Feel it heating, getting warmer, hotter, now burning underneath you. Close to you a popcorn kernel explodes. One by one other popcorn kernels pop to life. White clouds appear to be bursting out all around you. The sound of popping drums in your ears. You are cramped, uncomfortable, steaming hot, sweating, dizzy. Your whole body feels too tight. You are trapped within a too-tight suit. Suddenly, you, the popcorn kernel, feel yourself exploding, bursting. All at once you are light and fluffy. Bobbing up and down with other popcorn. At last the popping sound begins to quiet. Just an occasional pop, pop, and at last silence.

The snowy night short story was as follows:

You are outside and the sun has already set. You are walking into nighttime. Lean your head back now. Look up at the evening sky. The night grows darker, blacker, layers of black until it is the darkest evening of the year. The darkness is a black syrup filling in every crack behind the trees' branches blocking out any sign of light. You watch the black blanket of night overhead. Out of it falls a snowflake. Then another. They twinkle and spin softly. They are very small pieces of nature's jewelry falling gently downward. One after another they come. Dusting the ground. Spreading a powder over the branches of the trees. The woods are white. A damp blanket of snow like wet flower petals covers your face.¹

Creativity Training

Procedures were similar to those used by Eisenberger and Armeli (1997) and Eisenberger, Haskins, and Gambleton (1999). Throughout the experiment, each child was seated facing the experimenter on the opposite side of a desk. We presented children in the unrewarded creativity-training group and the rewarded creativity-training group with 18 names for common objects, 1 object at a time. 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 condition. The experimenter stated the following directions, which included a practice problem, to children in the unrewarded and rewarded creativity-training conditions:

I am going to show you words for everyday objects. When I show you each word, read it out loud. Then tell me an 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? Okay, Here is the first word. What is this word? [Word shown to participant, who responds.] What is an unusual use for a ____? [Participant responds.]

When a child in either of the creativity-training groups stated an object use on a given trial, the experimenter judged whether the use given for the object was unusual and incorporated the distinctive properties of the object. If the child gave a conventional use for an object, the experimenter said, "That is something people often do with a _____. Tell me something unusual you might do with a _____." If the child gave an impossible use or a use that did not involve the unique features of the object, the experimenter said, "Tell me something unusual you might *actually* do with a _____." In the rare instance that the child still failed to give an unusual use, the experimenter told the child, "Incorrect," and went on to the next word.

Following each creative use given by a child in the unrewarded creativity-training group, the experimenter told the child, "That's correct." Children in the rewarded creativity-training group were told, "That's correct. Here's 5 cents," and five pennies were placed to the side of the child within plain view. For the rewarded creativity-training children, on subsequent trials, the monetary rewards were placed next to the monetary rewards given on the previous trials. Children in the control group did not receive training on the initial task.

Tests of Generalized Creativity

In the first study, all children were given the sheet of paper containing the written instruction to "think up names for a movie about a student's summer vacation" and 16 horizontal lines on which to write the titles. The experimenter asked the child to read the instruction silently as the experimenter read it out loud. The experimenter stared at a book until the child indicated he or she no longer wished to continue or provided all 16 titles.

In the second study, all children were given a sheet of paper containing the popcorn short story with the written instruction to "list five possible titles for this story" with five numbered lines on which to write answers. The experimenter asked the child to read the instructions silently as the experimenter read them out loud. After the child finished writing the five answers for the popcorn short story, the experimenter gave the student a sheet of paper containing the snowy night short story, with corresponding instructions to give five possible story titles.

Results and Discussion

In both studies, children in the unrewarded creativity-training group and the rewarded creativity-training group gave creative object uses on more than 99% of the training trials. In the first study, the average numbers of movie titles given by the control group, unrewarded creativity-training group, and rewarded creativity-training group, out of 16 possible, were not statistically different: 8.4, 8.9, and 9.3, respectively, $F(2, 69) = 0.31$. Because the instructions allowed each child to determine how many movie titles to give, children gave different numbers of titles. Therefore, we asked each of the three judges to assign a creativity score from 1 (*little or no creativity*) to 5 (*highly creative*) for each child's entire set of answers. In this and the following two studies, creativity was defined for judges as novelty combined with quality in terms of how well responses dealt with the posed problem. The judges were unaware of the participants' conditions in all three studies. The effective interrater reliability (Rosenthal & Rosnow, 1984) of the creativity scores assigned by the three judges was .88. In the first study, the correlation between the number of movie titles given and the average creativity score ($r = .13$) was not statistically significant. Of more direct interest, orthogonal planned comparisons using the pooled error term revealed that the average creativity score for the movie titles given by the rewarded creativity-training group ($M = 3.24$) exceeded the average score for the control and unrewarded creativity-training groups ($M_s = 2.38$ and 2.70) and that the latter two groups did not differ from each other, $t_s(69) = 3.05$ and -1.23 , $p_s < .01$ and ns , respectively.

¹ This and the previous excerpt are adapted from M. E. Seyba (1984). *Imaging: A different way of thinking*. Hawthorne, NJ: Educational Impressions. Copyright 1984 by Educational Impressions. Reprinted with permission.

In the second study, three judges assigned creativity scores from 1 (*little or no creativity*) to 5 (*highly creative*) to each popcorn story title. The five scores assigned to each child by a given judge were then averaged. The same procedure was followed for the snowy night story. Examples of creative titles the students gave the popcorn story include "The Scared Kernel," "Exploding Into Someone New," "A Hot Encounter," and "A Bad Time for One Little Kernel." Examples of creative titles the students gave the snowy night story include "Soft Jewelry," "Black to White," "As the Night Falls," and "The Coming of Winter." The effective interrater reliabilities were .94 for the popcorn story and .89 for the snowy night story. For the popcorn story, with the pooled error term, orthogonal planned comparisons indicated that the average creativity score of the rewarded creativity-training group ($M = 2.35$) reliably exceeded the average creativity score of the control and unrewarded creativity-training groups ($M_s = 2.05$ and 2.07) and that the difference between the latter two groups was not statistically significant, $t_s(94) = 2.46$ and -0.16 , $p_s < .02$ and ns , respectively. Similarly, for the snowy night story, with the pooled error term, orthogonal planned comparisons indicated that the average creativity score of the rewarded creativity-training group ($M = 2.29$) reliably exceeded the average creativity score of the control and the unrewarded creativity-training groups ($M_s = 2.03$ and 1.93) and that the difference between the latter two groups was not statistically significant, $t_s(94) = 2.88$ and 0.85 , $p_s < .01$ and ns , respectively.

The first 2 studies suggest that reward given explicitly for creative performance produces a generalized increase in creativity that is observable in new tasks. Whether children were free to generate as many responses as they wished (Study 1) or were asked to generate a fixed number of responses (Study 2), reward for creativity in an initial task produced greater subsequent creativity than did the same creativity training without reward or the absence of creativity training. In contrast, creativity training without reward did not produce greater creativity than did the absence of creativity training.

Studies 1 and 2 indicate that repeated reward given explicitly for creative performance increases creativity, not merely the novelty of performance, as found in previous studies (Eisenberger & Armeli, 1997; Eisenberger & Selbst, 1994). Contrary to the view that reward generally decreases creativity (Amabile, 1996; Collins & Amabile, 1999), tangible reward evidently enhances creativity when recipients construe a positive relationship between creative performance and reward. These findings are consistent with learned industriousness theory (Eisenberger, 1992), according to which individuals learn the dimensions of performance (e.g., creativity) that are rewarded, are motivated to perform well in these performance dimensions, and generalize such learning to new tasks.

Study 3: Effects of Promised Reward on Creativity

Studies 1 and 2 adapted the methodology used by researchers who take a utilitarian approach to studying the relationship between reward and creativity, involving repeated reward for creative performance. In contrast, cognitively oriented investigators typically forgo such creativity training in favor of the simpler procedure of promising reward on a single occasion. According to learned industriousness theory (Eisenberger, 1992), expected re-

ward for creative performance, whether established by repeated reward for creativity or by the promise of reward for creativity, should increase creative performance. Thus, it should be possible to show incremental effects of reward on creativity using verbal promises of tangible reward as well as repeated tangible reward. Eisenberger et al. (1998) found that the promise of reward explicitly for novel performance increased novelty. Study 3 examines whether the promise of reward can be used to increase creativity in addition to novelty. College students were asked to generate creative titles for a short story, for which one group was promised a monetary reward.

Method

Participants and Materials

Participants were 115 college students enrolled in an introductory psychology course. We gave the students a 20.3 cm \times 27.9 cm sheet of paper containing the experimental instructions, the popcorn short story used in Study 2, and five numbered horizontal lines on which to list story titles.

Procedure

The study was introduced as a class project 30 min before the scheduled end of a lecture session. The instructor told the class that the directions for the assignment were printed on a sheet of paper to be given them and that they were to complete the assignment silently. Students were separated by empty seats so that they would not be able to read others' sheets. The one-page sheet was next handed out to each student. The sheet contained the instruction, "Please read the directions carefully before doing this exercise. Please be totally silent and work on this assignment in class by yourself." The printed instructions asked the students to give their name and social security number. All students were given the same popcorn short story used in the second study and were instructed to produce five creative titles. Every second student received the printed promise of a reward for creative performance. The instructions given in the reward condition were as follows:

You are to read the short story on this page. When you are finished reading, in the spaces provided, print five possible creative titles that fit the short story. If your titles are judged to be among the top half of the students in this class in terms of creativity, you will receive a financial reward next week for you to keep. When you are finished printing the titles, you should hand this page to the persons at the doors and then leave. You may leave without waiting for other students to finish. Please go ahead and read the short story.

The instructions for the unrewarded students were the same except for the omission of the statement promising the reward. All instruction sheets contained the same final direction, stating, "After you have printed five titles, you may give this page to the persons at the doors and then leave." Two research assistants, located outside the classroom doors, collected the pages. To assess whether the reward condition influenced the duration that students took to complete the task, we unobtrusively recorded the sequential order in which students returned the pages.

Results and Discussion

All students completed the assignment silently before the scheduled end of class. Three undergraduate research assistants assigned a creativity score from 1 (*little or no creativity*) to 5 (*highly creative*) to each popcorn story title. The five scores assigned to each student by each judge were then averaged. The effective interrater reliability for the students' average scores was .82.

Examples of creative titles the students gave the popcorn story include "The Little Kernel That Could," "The Golden Years," "White Dance," "Coming Out," and "Growing Pains." The relationship between the duration that the students took to complete the task, assessed by the order in which students' response sheets were returned, and the average creativity of the titles was statistically unreliable (Spearman rank correlation = .07, $p = .48$). The planned comparison was one-tailed, with the direction of prediction dictated by theory, consistent findings of Studies 1 and 2, and previous findings that reward promised specifically for novel performance increased novelty (Eisenberger et al., 1998). Students who were promised a reward produced titles of greater creativity than did students who were not promised a reward ($M_s = 2.75$ and 2.56, respectively), $t(114) = 1.72, p < .05$.

The results of the third study indicate that the promise of reward for creative performance increases creativity. The previous conundrum in utilitarian-oriented studies between reward and cues concerning desirable performance was eliminated by the provision of cues to rewarded groups and control groups indicating the appropriateness of creative performance. Taken together, the results of the first 3 studies show that procedures examining the effects of reward on creativity favored both by utilitarian-oriented researchers (repeated reward) and cognitively oriented researchers (promised reward on a single occasion) can be used to strengthen creativity. Contrary to views that reward may increase performance novelty but not the generation of creative responses (Amabile, 1996; Hennessey & Amabile, 1998b), we found that expected reward for creative performance increased creativity, as assessed by Amabile's consensual evaluation technique. When creativity is necessary for reward, people perform more creatively.

Study 4: Reward Expectancies, Intrinsic Task Interest, and Creativity

We found in the first 3 studies that expected reward for creative performance increased creativity. The findings of the first 3 studies are consistent with learned industriousness theory (Eisenberger, 1992), according to which individuals learn which performance dimensions lead to reward and are motivated to perform accordingly. People adapt their performance in ways that produce favored rewards, whether this requires carrying out a task more creatively (Studies 1–3) or with greater speed or accuracy (Eisenberger, Rhoades, & Cameron, 1999).

Expected rewards may increase creativity in an additional way. Expected reward for high performance in general might strengthen intrinsic task interest by increasing perceived self-determination (Eisenberger, Rhoades, & Cameron, 1999), leading to greater creativity. Thus, we suggest that utilitarian and romanticist views of creativity may both be partially correct. Consistent with utilitarian accounts of novel performance, creativity may be enhanced or diminished on the basis of favorable or unfavorable consequences. In accord with romanticist accounts (e.g., Amabile, 1983; Deci and Ryan, 1985; Maslow, 1968; Rogers, 1954), perceived freedom may also contribute to creativity; however, we amend accounts by Amabile (1983) and Deci and Ryan (1985) by suggesting that expected reward for high performance increases rather than decreases perceived self-determination and thus enhances creativity.

Study 4 examines the mediating role of intrinsic job interest in the predicted positive relationship between employees' expected reward for high performance and creativity. We surveyed employees working for a large electronics and appliance sales organization about their expectancies that high job performance would bring increased pay and about their intrinsic interest in their daily job activities. Supervisors were asked to evaluate the creative suggestions employees made while on the job. We controlled for differences in creativity due to employees' length of tenure in the organization.

Method

Sample and Procedure

We administered the survey to 331 employees at eight of the organization's sites located in the Northeastern United States. Employees voluntarily completed the survey during their regularly scheduled working hours in conference rooms at each site. To encourage candidness, we gave employees verbal and written assurances that their individual responses would be kept confidential and that only group data would be reported to the organization. The surveys were distributed and collected by the investigators in sealed envelopes. A total of 326 employees (98.5%) returned questionnaires. Of these, 313 employees (94.6% of the original sample) returned the questionnaire with every item answered on each scale, as required for our statistical analysis, which involved structural equation modeling (SEM). Thirty-seven percent of the sample were sales-support employees paid on an hourly basis (e.g., cashiers, clerks, stockers), 43% were salespeople paid on an hourly basis, 16% were salaried sales-support employees, and 5% were salaried salespeople. The mean tenure of these employees was 46 months ($SD = 47$), and all had worked for the organization at least 6 months. Twenty-nine percent were women.

Employees' immediate supervisors were asked to judge the creative suggestions their employees made while on the job, using a rating scale that we provided. These supervisors were thoroughly familiar with the nature of their subordinates' jobs, were responsible for evaluating and maintaining the satisfactory performance of the employees, and interacted with the employees on a daily basis. These evaluations were completed privately by the supervisors during regular work hours within 1 week following the employee's completion of the survey. Supervisors received the same guarantees of confidentiality that were given to the participants.

Measures

Tenure. Each employee's number of months employed by the organization was obtained from company records.

Performance-reward expectancy. To assess performance-reward expectancy, we asked employees to state the extent of their agreement with the statements, "If I perform well at _____ (name of organization), it leads to higher pay" (Sims, Szilagyi, & McKeney, 1976) and "Good performance in my job leads to higher pay." The employees responded on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). Responses to the two items were summed to obtain a performance-reward expectancy score.

Intrinsic task interest. Using descriptive adjectives commonly used to assess intrinsic task interest (Cameron & Pierce, 1994), we asked employees to rate on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*) the extent of their agreement with each of four statements, two worded in the positive direction ("My job is interesting"; "My job is enjoyable") and two worded in the reverse direction ("My job is boring"; "My job is unpleasant"). To assess the dimensionality of the scale, we carried out an exploratory factor analysis. Eigenvalues indicated a single dominant factor with all loadings greater than .49. Therefore, employees' responses to the four items were summed to produce an overall intrinsic job interest score.

Creativity. Supervisors responded to two descriptive items concerning employees' creativity ("This employee generates creative ideas"; "This employee makes suggestions to improve the functioning of his/her work group") by indicating the extent of their agreement on a 5-point Likert scale (1 = *disagree*, 5 = *very strongly agree*). Supervisors were asked to evaluate the creativity of each employee relative to other employees holding similar jobs.

Results and Discussion

The scales measuring expected reward for high performance, intrinsic task interest, and creativity showed acceptable levels of internal reliability (Cronbach's $\alpha = .95, .78, \text{ and } .88$, respectively). We used SEM to assess the mediating effect of intrinsic interest on the relationship between expected reward and creativity, with measurement error removed. Kenny, Kashy, and Bolger (1998, p. 260) described the two critical outcomes required to show mediation with SEM. First, the exogenous variable (performance-reward expectancy) must have a statistically significant relationship with the mediator (intrinsic interest). Second, the mediator (intrinsic interest) must have a statistically significant relationship with the outcome variable (creativity), controlling for the exogenous variable (performance-reward expectancy). As shown in Figure 1, these outcomes were assessed with a model in which performance-reward expectancy led to creativity directly and indirectly through intrinsic interest. We wished to rule out the possibility that relationships between performance-reward expectancy and intrinsic interest and between intrinsic interest and creativity might be an artifact of employees' tenure in the organization. Thus, we included tenure as an exogenous variable predicting intrinsic interest and creativity.

Individual scale items served as indicators of the latent variables. To set the metric of the latent variables, on the basis of factor analysis we chose the highest loading item from each scale as a reference indicator; the loadings for these indicators were set to a value of 1. The model was estimated from the covariance matrix and used maximum likelihood estimation. For ease of presentation, Figure 1 presents the structural model rather than the full measurement model, and the results of tenure are presented in the text.

The model showed adequate fit to the data: root-mean-square error of approximation (RMSEA) = .050, comparative fit index (CFI) = .99, Tucker-Lewis index (TLI) = .98, $\chi^2(23, N = 313) = 42.98$; $\chi^2/df = 1.87$. The control variable, tenure, was positively related to intrinsic interest and creativity ($\beta_s = .16$ and $.18$, respectively, $ps < .01$). Standardized path coefficients can be seen in Figure 1. As predicted, the relationship between performance-reward expectancy and intrinsic interest was statistically

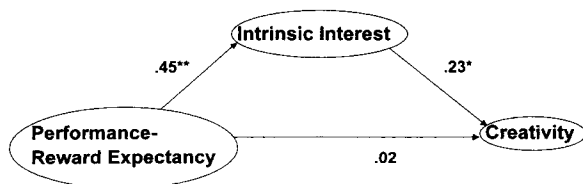


Figure 1. Structural equation model of the relationships among performance-reward expectancy, intrinsic interest, and creativity (Study 4). * $p < .05$. ** $p < .01$.

significant, thereby satisfying Kenny et al.'s (1998) first condition for mediation. Also, intrinsic interest was significantly related to creativity, controlling for the relationship between performance-reward expectancy and creativity, thereby satisfying Kenny et al.'s second condition for mediation. Thus, the data support the view that expected reward for high performance generally increases intrinsic interest, which, in turn, increases creativity.

Next, we addressed the alternative possible hypothesis that intrinsic interest leads to performance-reward expectancy, which, in turn, leads to creativity. Mediation was assessed with a model in which intrinsic interest led to creativity both directly and indirectly through performance-reward expectancy. Corresponding to the previous analysis, we included tenure as an exogenous variable leading to both performance-reward expectancy and creativity. The key second step of the analysis failed to support the mediation hypothesis: Performance-reward expectancy did not have a significant relationship with creativity when we controlled for intrinsic interest's relationship with creativity ($\beta = .019, ns$). Therefore, the evidence does not support the possibility that performance-reward expectancy mediated the relationship between intrinsic interest and creativity.

Consistent with views that emphasize intrinsic task interest's contribution to creativity (e.g., Amabile, 1983; Collins & Amabile, 1999; Deci & Ryan, 1985), intrinsic job interest was positively related to employees' creativity. However, contrary to the assertion that reward generally decreases intrinsic interest, a positive relationship was found between performance-reward expectancy and creativity, as mediated by intrinsic job interest. The findings suggest that expected reward for high performance increases intrinsic task interest, leading to heightened creativity.

Study 5: Reward Expectancies, Perceived Self-Determination, and Creativity

We suggest that offers of reward for high performance increase perceived self-determination, leading to greater intrinsic task interest and, therefore, creativity. Study 5 examines the mediating role of perceived self-determination in the predicted positive relationship between employees' expected reward for high performance and creativity. We gave all employees the opportunity to provide written suggestions, to be reported anonymously, that would help the organization increase profits or cut costs.

Method

Sample and Procedure

We administered the survey to 254 employees at eight sites of the same organization examined in Study 4. The independent samples of participants used in Studies 4 and 5 had no prior information concerning the studies' hypotheses. A total of 248 employees (97.6%) returned questionnaires. Of these, 239 employees (94.1% of the original sample) answered all scale items, as required for our statistical analysis involving SEM. Forty-nine percent of the sample were sales-support employees paid on an hourly basis (e.g., cashiers, clerks, stockers), 26% were paid salespeople paid on an hourly basis, 16% were salaried sales-support employees, and 7% were salaried salespeople. The mean tenure of these employees was 46 months ($SD = 45$), and all had worked for the organization for at least 6 months. Twenty-four percent were women. We administered the questionnaires using the same procedures as in Study 4.

Measures

Tenure. Each employee's number of months employed by the organization was obtained from company records.

Performance-reward expectancy. Employees' performance-reward expectancy was assessed with the same two items and response alternatives used in Study 4.

Perceived self-determination. To assess perceived self-determination, we asked employees to express their degree of agreement or disagreement with the following five items on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*): "I have the freedom to adopt my own approach to the job"; "My job allows me opportunity for independent thought and action"; "I have control over how I do my work"; "I have control over how quickly or slowly I work"; "I have control over the quality of my work." The first item was adapted from Ronen, Kraut, Lingoes, and Aranya (1979), the second item from Tetrick and LaRocco (1987), and the final three items from Dwyer and Ganster (1991). To determine the dimensionality of the scale, we carried out an exploratory factor analysis. Eigenvalues indicated a single dominant factor with all loadings greater than .53.

Creativity. To assess employee creativity, we included an open-ended question asking for "ways to increase profitability or reduce costs at _____." Four psychology graduate students who had carried out research in the organization in the past and were familiar with its operations were asked to evaluate the creativity of each employee's suggestions on the basis of novelty and practical utility. The judges, who were unaware of the identity of individual respondents, evaluated the creativity of each employee's suggestions on a scale ranging from 1 (*little or no creativity*) to 5 (*highly creative*).

Results and Discussion

The measures of expected reward for high performance and perceived self-determination showed acceptable levels of internal reliability (Cronbach's $\alpha = .87$ and $.77$). The effective interrater reliability of the creativity scores assigned by the five judges was $.89$. Using the same statistical procedures as in Study 4, we assessed the mediating effect of perceived self-determination on the predicted positive relationship between expected reward for high performance and employee creativity. As shown in Figure 2, these outcomes were examined with a model in which performance-reward expectancy led to creativity directly and indirectly through perceived self-determination. As with Study 4, for ease of presentation, Figure 2 presents the structural model rather than the full measurement model, and the effects of the covariate, tenure, are presented in the text.

The model showed adequate fit to the data: RMSEA = $.049$, CFI = $.97$, TLI = $.96$, $\chi^2(61, N = 239) = 95.6$; $\chi^2/df = 1.57$. Tenure was positively related to perceived self-determination ($\beta = .20, p < .01$) but not to creativity ($\beta = .06, ns$). Standardized path

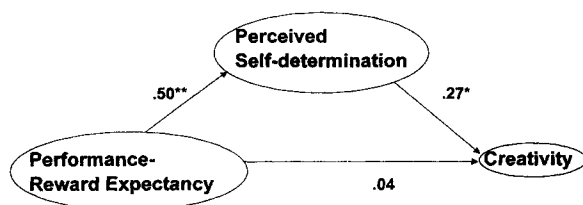


Figure 2. Structural equation model of the relationships among performance-reward expectancy, perceived self-determination, and creativity (Study 5). * $p < .05$. ** $p < .01$.

coefficients can be seen in Figure 2. As predicted, the relationship between performance-reward expectancy and perceived self-determination was statistically significant, thereby satisfying Kenny et al.'s (1998) first condition for mediation. Also, perceived self-determination was significantly related to creativity, controlling for the relationship between performance-reward expectancy and creativity, thereby satisfying Kenny et al.'s second condition for mediation. Thus, the data are consistent with the view that performance-reward expectancy increases creativity through increased perceived self-determination.

Next, we addressed the alternative possible hypothesis that perceived self-determination leads to an increased performance-reward expectancy, which, in turn, increases creativity. Mediation was assessed with a model in which perceived self-determination led to creativity directly and indirectly through performance-reward expectancy. Corresponding to the previous analysis, we included tenure as an exogenous variable leading to both performance-reward expectancy and creativity. The key second step failed to support the mediational hypothesis: Performance-reward expectancy did not have a statistically significant relationship with creativity, controlling for perceived self-determination's relationship with creativity ($\beta = .037, ns$). Therefore, the evidence did not support the alternative hypotheses that performance-reward expectancy mediates the relationship between perceived self-determination and creativity.

Employees' expectation that high performance would lead to reward was positively related to the creativity of suggestions to help the organization increase profitability or reduce costs. This association was mediated by perceived self-determination. These findings are consistent with the view that expected reward for high performance leads to greater perceived self-determination over one's actions, contributing to intrinsic task interest and creativity.

General Discussion

Our results indicate two ways rewards can be used to increase creativity. First, reward that is specifically contingent on creativity increases the extrinsic motivation to be creative. Studies 1 and 2 found that repeatedly giving preadolescent students reward for creativity in one task increased their creative performance in subsequent tasks. Further, Study 3 reported that the promise of reward for creativity increased college students' creative performance. Second, expected reward for high performance generally increases creativity by enhancing perceived self-determination and intrinsic task interest. Study 4 found that employees' intrinsic job interest mediated a positive relationship between expected reward for high performance and creative suggestions offered at work. Additionally, Study 5 found that employees' perceived self-determination mediated a positive relationship between expected reward for high performance and the creativity of anonymous suggestions made to help the organization.

Extrinsic Motivation for Creativity

Repeated reward for creative performance produced a generalized increase in preadolescent students' creativity (Studies 1 and 2). Children who were rewarded for giving creative uses for physical objects subsequently gave more highly creative movie and short-story titles than did children who had generated creative

object uses without reward or who had not received the object-uses task. These generalized reward effects occurred whether the children were allowed to give as many responses in the test task as they wished (Study 1) or were required to give a fixed number of responses (Study 2). The effects were persistent, occurring in both of two consecutive test tasks (Study 2). By including control groups who received the same information as did the rewarded groups concerning the appropriateness of creative performance, these studies eliminated the confound between reward and cues for creativity that is often found in utilitarian-oriented studies.

Study 3 found that college students who were promised reward for creative short-story titles produced more highly creative titles than did students who were given the same creativity instructions without the promise of reward. Thus, the anticipation of reward for creative performance increased creativity, using the research methodologies favored by utilitarian-oriented researchers (repeated reward presentations in Studies 1 and 2) and cognitively oriented researchers (reward promised on a single occasion in Study 3). Regarding Study 3, it might be argued that because participants in both the rewarded group and the control group were asked to identify themselves on their response sheets, they may have felt that their performance would subsequently be evaluated. However, beyond any such effects of anticipated evaluation on the creativity of both the rewarded group and the control group, creativity was greater for the rewarded group. We found that financial reward promised specifically for creativity increased creative performance whether the promised amount was specified (Studies 1 and 2) or unspecified (Study 3). These findings indicate that when individuals construe a positive relationship between creativity and reward on the basis of past experience or current task instructions, they perform more creatively.

Previous findings that reward can be used to increase the variability of sequences of responses (Neuringer, 1986, 1993; Page & Neuringer, 1985; Stokes, 1995, 1999a) and the novelty of individual responses (Eisenberger & Armeli, 1997; Eisenberger, Armeli, & Pretz, 1998; Eisenberger, Haskins, & Gambleton, 1999; Eisenberger & Selbst, 1994) are now extended to creativity, involving the combination of novelty with quality of performance. The present results are inconsistent with the frequent assumption that rewards inherently reduce creativity by causing individuals to focus on the goal at the expense of creativity (Amabile & Cheek, 1988, p. 60). We found that reward for creative performance produced a generalized increase in preadolescent students' creativity and that the promise of reward for creativity increased college students' creativity in the current task. Reward for creative performance appears to orient recipients toward the generation and selection of novel responses that are particularly well-suited to a specific problem or practical application.

Past and present findings concerning reward's effects on creativity are consistent with learned industriousness theory (Eisenberger, 1992), according to which individuals learn which dimensions of performance are rewarded, resulting in the motivation to perform appropriately. Information available in the current task regarding the appropriateness of creative performance should produce positive effects of reward on creativity, as was found in Study 3. In the absence of information in the current task concerning the desirability of conventional performance versus creative performance, individuals would generalize from previous experience. Learned industriousness theory correctly predicted for Stud-

ies 1 and 2 that reward for creativity in one task would increase the subsequent creativity with which a different task was performed.

Because people are more commonly rewarded for conventional than for creative performance in everyday life, they may learn to perform conventionally in the absence of cues indicating the desirability of creativity. Thus, prior studies found that when participants were given task instructions that did not specify the nature of appropriate performance, they performed conventionally after receiving reward for simple, conventional performance in a preliminary task (Eisenberger & Selbst, 1994, Experiment 1; McGraw & McCullers, 1979). By contrast, we found in Studies 1 and 2 that participants who were given inexplicit instructions performed creatively following the prior experience of reward for creative performance.

The demonstration that the incentive properties of reward contribute to creativity requires a control group that receives the same information as the rewarded group concerning the creative nature of the task (Amabile, 1983, p. 183; Eisenberger & Selbst, 1994; Stokes, 1999b). Performance feedback was used in Studies 1 and 2 to provide both the rewarded group and the treatment control group with information concerning the desirability of creative performance. Because performance feedback involved use of the comment "Correct" for creative responses, it might be argued that these studies demonstrate the greater effectiveness of verbal plus monetary reward over verbal reward alone for increasing creativity. However, the group receiving performance feedback did not show greater generalized creativity than did the no-treatment control group. Therefore, there is no evidence that the performance feedback served as an effective reward in the present studies.

Further, even if performance feedback had acted as an effective reward, our findings would still be important. If, as supposed by Amabile (1983), tangible rewards distract individuals from "the task itself and nonobvious aspects of the environment that might be used in achieving a creative solution" (p. 120), participants receiving performance feedback plus tangible reward should have less intrinsic interest and perform less creatively than participants receiving performance feedback alone. We found precisely the opposite result: Performance feedback plus reward produced greater subsequent creativity than did performance feedback alone. Performance feedback commonly accompanies tangible rewards in everyday life. Thus, the result that rewards can be used to enhance creativity beyond any effects of performance feedback has major practical as well as theoretical implications.

Performance feedback was not involved in Study 3, in which instructions rather than repeated reward were used to establish the expectation that creativity would be rewarded. Instructions were used to indicate the creative nature of the task to two groups, with one of the groups promised tangible reward. Therefore, reward can be used to increase creativity when the dependence of reward on creativity is indicated either by performance feedback or by task instructions.

Studies by Amabile and colleagues (Amabile, 1983; Collins & Amabile, 1999) reported decremental effects of reward promised for unspecified performance on creativity, whereas Eisenberger and Armeli (1997) reported incremental effects of repeated reward for novelty. In the present view, this difference in findings results from the information conveyed to participants concerning the appropriateness of conventional performance versus creative performance. When information conveyed the appropriateness of

creative performance, Amabile's promised-reward procedure increased novel performance (Eisenberger et al., 1998; Eisenberger, Haskins, & Gambelton, 1999) and creativity (Study 3). Moreover, money promised for unspecified performance had incremental or decremental effects on novel performance depending on whether prior experience indicated that reward depended on novel performance or conventional performance (Eisenberger & Armeli, 1997; Eisenberger & Selbst, 1994). Reward for unspecified performance increased novelty among children who had previously been rewarded for unusual responses on a preliminary task. Reward for unspecified performance decreased novelty among children who had previously been rewarded for usual responses on a preliminary task.

Rewards, Intrinsic Motivation, and Creativity

Our results indicate that reward for high performance in general as well as reward specifically for creative performance can increase creativity. Despite the widespread view that reward lessens creativity by reducing intrinsic task interest (Amabile, 1983; Collins & Amabile, 1999; Deci & Ryan, 1985), the present research is the first to empirically assess the contribution of intrinsic interest to the relationship between expected reward and creativity. Studies 4 and 5 examined the relationship between expected reward for high performance and creativity, as mediated by intrinsic task interest and perceived self-determination.

Deci and Ryan (1985) argued that "if people begin an activity with expectations of being paid, they are likely to be more extrinsically motivated for the activity than intrinsically motivated" (p. 54). Amabile and Cheek (1988) stated that the expectation of reward reduces creativity by causing tasks to be "initially defined more narrowly. . . . simply as a means to an end, rather than an opportunity for exploration and cognitive play" (p. 60). According to Amabile's (1983) view, the expectation that high performance will lead to reward, whether induced by repeated reward presentation, by promised reward, by observation of others' being rewarded, or by other factors, decreases perceived intrinsic task interest and, therefore, creativity. However, our data suggest that performance-reward expectancies are positively related to creativity through increased perceived self-determination and intrinsic task interest.

We found in Study 4 that intrinsic job interest mediated a positive relationship between employees' expectation of reward for high performance and their creative suggestions made at work. Employees who expected reward for high performance were more interested in their jobs, and this interest was associated with creative suggestions for improving the operations of their organization. These results are consistent with views that reward for high performance increases intrinsic task interest (e.g., Bandura, 1986, 1997; Carton, 1996; Dickinson, 1989; Eisenberger & Cameron, 1996; Flora, 1990; Mawhinney, 1990; Reitman, 1998). Expected reward for high performance may heighten intrinsic interest by increasing the symbolic importance of competent performance (Harackiewicz & Sansone, 1991) and by increasing perceived self-determination (Eisenberger, Rhoades, & Cameron, 1999), leading to greater creativity. In contrast, the expectation that reward will occur independently of performance has been found to reduce intrinsic task interest, perhaps by trivializing the task (Eisenberger, Pierce, & Cameron, 1999).

Employees engage in a variety of concurrent work-related activities, with some tasks oriented toward conventional performance and others toward creativity. Intrinsic task interest was previously found to mediate a positive relationship between expected reward and conventional job performance (Eisenberger, Rhoades, & Cameron, 1999). Together with the present result that expected reward for high performance increased the performance of a creative task through intrinsic job interest, the findings indicate that individuals channel intrinsic task interest, produced by reward, into creative or conventional behavior depending on their construal of appropriate task performance.

Study 5 found that perceived self-determination mediated an incremental relationship between expected reward and creativity. Employees who expected that high job performance would be rewarded felt more in control of their job performance, leading to more highly creative anonymous suggestions to aid the organization. People evidently understand that the promise of reward for high performance usually occurs because the person, group, or institution providing the reward believes that positive consequences are necessary to obtain the cooperation of the potential reward recipient. The organization's offers of reward for high performance would thus convey the optional nature of high performance, increasing the employees' perceived self-determination (Eisenberger, Rhoades, & Cameron, 1999). The increase of perceived self-determination, resulting from expected reward for high performance, would enhance the intrinsic interest that employees take in their jobs, leading to heightened performance in conventional and creative tasks.

The positive relationship we found between employees' perceived self-determination and their creativity follows from theories proposing that perceived autonomy increases work motivation (Alderfer, 1969; Herzberg, 1966; James et al., 1999; Maslow, 1943) and from cognitive-social accounts maintaining that perceived self-determination increases the enjoyment of ongoing activities (Deci & Ryan, 1985; Zuckerman, Porac, Lathin, Smith, & Deci, 1978). However, the positive association we obtained between expected reward for high performance and intrinsic task interest is inconsistent with views holding that tangible rewards convey a lack of control over one's own behavior (Deci & Ryan, 1985) or that tangible rewards simply serve to meet basic biological needs (e.g., Herzberg, 1966; Maslow, 1943). The offer of reward for high performance evidently signifies freedom of action concerning how to carry out one's job, leading to greater intrinsic task interest and performance. To allow Deci and Ryan's (1985) cognitive evaluation theory to better explain the present findings, the presumption that reward is experienced as a constraint on performance might be replaced with the assumption that rewards for high performance signify greater self-determination.

Studies 4 and 5 are the first to assess the mediating roles of perceived self-determination and intrinsic motivation in the relationship between reward and creativity. Future research might examine the relationships among expected reward, perceived self-determination, intrinsic motivation, and creativity within a single study. Because we did not systematically vary conditions leading to performance-reward expectancies, the possibility cannot be ruled out that extraneous variables were responsible for the observed relationships among the measured variables. Nevertheless, our predictions were theory based, and the findings were consistent with the view that performance-reward expectancies are positively

related to perceived self-determination, intrinsic task interest, and creativity. Moreover, the observed patterns of relationships among the variables, as assessed by structural equation modeling, were consistent with the theoretical position that perceived self-determination and intrinsic task interest mediate a positive relationship between performance-reward expectancies and creativity.

Individuals who are told that they will receive a reward for carrying out a task regardless of their performance have generally shown decreased intrinsic task interest. (Deci, Koestner, & Ryan, 1999). Perhaps such noncontingent reward lessens task interest by conveying the task's tediousness or triviality (Eisenberger, Pierce, & Cameron, 1999). Under these circumstances, individuals who are offered reward should perform less creatively both because they conclude that the individual who is offering the reward is uninterested in the quality of their performance and because they view the task as having limited opportunities for enjoyable or creative performance. Thus, beyond the present studies' examination of the mediating effects of intrinsic interest and perceived self-determination on the relationship between reward and creativity, more research is needed concerning how the manner of reward presentation affects the recipient's construals concerning the reward giver's motives and the recipient's perceived opportunities for interesting and creative performance.

Practical Implications

Some creative activities are enjoyable in the absence of expected reward. Many highly creative scientists and mathematicians, such as Einstein, Feynman, von Neumann, Ramanujan, and Szilard have been found to be highly motivated by their intrinsic interests (Clark, 1972; Gleick, 1992; Kanigel, 1991; Lanoutte, 1992; Macrae, 1992). For instance, the Indian mathematician Ramanujan had a strong affinity for mathematics long before his prowess brought him recognition (Kanigel, 1991). Nickerson (1999) noted that "there is a great deal of whimsy and play . . . in much of the thinking that scientists do—a considerable amount of toying with ideas and fantasizing—imagining oneself, for example, riding at the head of a beam of light" (p. 410). Many scientists, mathematicians, and artists greatly enjoy such cognitive play. At the same time, the biographical evidence suggests that such exploration is usually oriented toward creative accomplishment. Further, the creative activity of highly creative individuals is generally enhanced by the anticipation of acclaim and other rewards for their discoveries. Although reward is not a necessary condition for creativity, its appropriate use can substantially increase creativity, as shown by the present studies.

Social-cognitive studies of reward effects have generally failed to convey to participants a positive relationship between creativity and reward. Rewards evidently reduced creativity when individuals construed a positive relationship between conventional performance and reward in a particular task, on the basis of task instructions or prior reward received for conventional performance. When task instructions or recent experience do not provide information concerning the advisability of conventional performance versus creative performance, individuals appear to generalize their naturally occurring experience that reward is more often given for conventional than for creative performance. Thus, rewards associated with task instructions that fail to specify the nature of desirable performance often reduce creativity.

Because the results of such studies seemed to suggest the conclusion that rewards generally reduce intrinsic interest and creativity, many reviews of the research literature on reward and creativity advise against the use of reward in situations where creativity is desirable. Educators and employers are frequently informed that rewards are "enemies of exploration" (Condry, 1977, p. 459), reducing intrinsic task interest in students or employees and therefore lessening the spontaneity and flexibility of performance (e.g., Hennessey & Amabile, 1998a; Kohn, 1993; Tegano et al., 1991). However, too little attention has been given to the ecological validity of the studies on which such advice is based. In everyday life, teachers and business people who wish to use rewards to promote creativity generally make reward explicitly contingent on creativity. Such use of rewards is consistent with the present evidence that rewards given specifically for creative performance increase creativity.

We found that creativity was increased both by past experience and current instructions conveying a positive relationship between reward and creativity. Establishing purpose and intention to be creative seems to be important for creative accomplishment (Nickerson, 1999). Creativity is facilitated by a persistent focus on a creative question and a willingness to surmount obstacles (Sternberg & Lubart, 1991). Such a creative orientation may be fostered by reward given explicitly for creativity. Consequently, reward given for creative performance would be particularly useful in practical situations in which innovative approaches to various tasks are important (e.g., Davis, 1986; Edwards, 1989; Farr & Ford, 1990; Torrance, 1965, p. 131). Employers and educators who give reward explicitly for creativity are evidently not discouraging the behavior they seek to foster, as supposed by critics, but appear to be using effective methodologies to enhance creativity.

We also found that expected reward for high performance was associated with increased intrinsic task interest, leading to greater creativity in tasks that recipients viewed as oriented toward creativity. Previous findings indicate that intrinsic task interest that is based on reward for high performance also contributes to job activities requiring conventional performance (Eisenberger, Rhoades, & Cameron, 1999). Thus, reward readily increases or decreases creativity, depending on whether creative or conventional performance is construed to be appropriate.

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