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The Effects of Reward on Intrinsic Motivation: The Role of Experimenter Expectations

by

Katherine M. Banko 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment for the degree of Master of Education

In

Department of Educational Psychology

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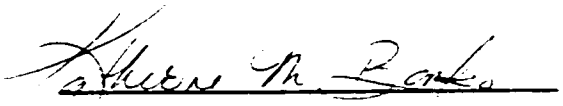

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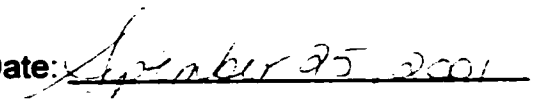
Date: 

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommended to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled The Effects of Reward on Intrinsic Motivation: The Role of Experimenter Expectations submitted by Katherine M. Banko in partial fulfillment of the requirements for the degree of Master of Education.

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Date: September 20, 2001

Dedication

For Andrew and Dylan

Who make everything seem worthwhile

Abstract

This research investigated the influence of experimenter expectancies on the effects of reward on intrinsic motivation. University students (n = 190) were assigned to pairs; one member of each pair was the "experimenter"; the other became the "participant". "Experimenters" were given a positive, a negative or no expectation about rewards. All "participants" worked on a task for a few minutes; half were offered $5.00 to do the task. "Participants" then, were given a free-choice period in which they could work on the task or do an alternate activity. The time "participants" spent on the task, task performance, and task interest were the measures of intrinsic motivation. "Participants" were also assessed on task difficulty, competency, self-determination, anxiety, and perceptions of the "experimenters'" behavior.

The results demonstrated a reversal expectancy effect on task interest and a decrease in "participants'" self-determination. Suggestions for strengthening the expectancy manipulation are offered for future research.

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CHAPTER 1

INTRODUCTION

Many researchers claim that providing people with an external incentive such as a prize, money, or a gold star for engaging in an already interesting activity is harmful because interest to perform the activity will decline once the reward is removed (Deci & Ryan, 1985). Their belief is that external rewards destroy people's intrinsic motivation. Proponents of this viewpoint draw their support from the findings of dozens of experiments that have been conducted on the topic. Typically, the general experimental paradigm used to investigate the effect of rewards on intrinsic motivation involves a great deal of communication and contact between experimenters and their participants. Because of this, the research addressing rewards and intrinsic motivation is susceptible to experimenter expectancy effects, which renders researchers more likely to obtain the results they expect to obtain solely because they expect those results (Rosenthal, 1966).

The general paradigm used to investigate effects of reward on intrinsic motivation involves a between-groups design. A session takes about one hour, during which participants work on interesting activities such as hidden-figure puzzles, art activities, or assembling puzzles. In a typical experiment, the experimenter meets the participants individually in a waiting room, escorts them to an experimental room, then goes to an observation room outside of the experimental room and communicates with participants via an intercom. Instructions are read to participants by the experimenter, an offer of reward (e.g.,

money, good player award, candy) is made to those in the treatment condition, and no offer is made to those in the control group. In some studies the reward is offered simply for doing the task; in other studies, participants must meet a specified performance standard. Participants in both groups then work on the experimental task. Following this, rewarded participants are given the reward.

To obtain a behavioral measure of intrinsic motivation, the experimenter creates a free-choice opportunity by making some excuse to leave his or her position for a short period of time, usually 8 minutes. Participants are instructed to continue doing the experimental task, to engage in an alternative activity (e.g., read magazines), or to do nothing. Participants are asked to remain in the experimental room until the experimenter returns. This session is known as the free-choice period. During the free-choice period, participants are usually unaware that they are being observed. The time they spend on the target activity (free-time) is used as one of the main measures of intrinsic motivation. Other measures used in several experiments on the topic are performance on the task during the free-choice period and participants' self-reports of task interest.

Since the 1970's, over 100 experiments have been conducted to investigate the effect of rewards on intrinsic motivation. The findings from these studies have been diverse: positive, negative, and no effects have been reported. In recent years, attempts to understand these disparate results have resulted in several meta-analyses of the literature (Cameron & Pierce, 1994; Deci, Koestner, & Ryan, 1999; Eisenberger & Cameron, 1996). Interestingly, the findings and conclusions of the various meta-analyses have not been consistent.

Cameron and Pierce (1994) and Eisenberger and Cameron (1996) concluded that negative effects of reward are limited to a specific set of circumstances and that when contingencies are arranged appropriately, rewards can be used to enhance measures of intrinsic motivation. On the other hand, using cognitive evaluation theory to guide their review of the literature, Deci et al.'s (1999) meta-analysis indicated pervasive negative effects of reward.

In the most recent meta-analysis of this literature, Cameron, Banko, and Pierce (2001) showed that when the experiments on the topic are organized according to the actual procedures used (rather than by any particular theoretical orientation), rewards decrease, enhance, or have no effect on intrinsic motivation. Specifically, the researchers found that verbal praise and tangible rewards offered for meeting or surpassing a performance standard led to increases in intrinsic motivation. A negative effect was obtained when rewards were tangible, offered beforehand, and not linked to any performance criterion.

In all of the meta-analyses to date, a negative effect has been found for tangible rewards offered simply for doing a task, without regard to any level of performance. This negative effect is statistically significant in each of the meta-analyses and has been found on measures of free-choice intrinsic motivation and self-reported task interest. Given that tangible rewards offered simply for doing a task have consistently been shown to produce negative effects, the present study was designed to investigate this type of reward contingency.

An examination of the experiments on the effects of reward on intrinsic motivation reveals three interesting observations. First, the results of the studies

are most often in accord with the predictions made by the researchers. That is, it appears that the researchers find what they expect to find. Second, no study has completely controlled for communication of experimenter expectancies.

The third point concerns Deci's (1971, 1972) initial experiments on this issue. In the first published study on the topic, Deci (1971) claimed that his findings showed that external rewards (such as money) were destructive of a person's intrinsic motivation. Deci's claim was controversial and led several researchers to be critical of the procedures used in his initial study. In a subsequent study, Deci (1972) attempted to improve upon his original design; one change was to control for possible experimenter bias. The results indicated no negative effect of reward. In other words, when potential experimenter bias was controlled for, rewards did not lead to decreases in measures of intrinsic motivation.

The Possible Influence of Experimenter Expectations

Based on the above observations, it is my contention that the observed undermining effect of reward found in many studies might actually be due to experimenter expectancy effects. An experimenter expectancy effect occurs when people's expectations serve as self-fulfilling prophecies. That is, if someone expects an event to happen, this hope shapes the expecter's behavior in such a way to make the predicted event more likely to occur. The experimenter expectancy effect has been empirically documented in laboratory and applied settings with both animal subjects and human participants (Harris & Rosenthal, 1985; Rosenthal & Rubin, 1978).

One approach to assess experimenter expectancy effects is to use an expectancy control design (Rosnow & Rosenthal, 1999). A 2 X 2 factorial design is usually used. One variable, experimenter expectancy has two levels (an expectancy of an effect, no expectancy). The second variable, the phenomenon of interest, involves an experimental condition and a control condition.

For example, in education, suppose one were interested in determining whether a new teaching strategy was more beneficial than the traditional technique on students' performance in mathematics. In a basic experimental design, students would be assigned to one of two groups – the treatment group (the new teaching strategy) or the control group (the traditional method).

To combine this paradigm with the expectancy design, those who were going to teach and assess students' performance would be assigned to one of two groups. The teachers (or assessors) in the expectancy condition would be given an expectancy induction. Specifically, they would be led to expect that the new teaching strategy would produce a higher level of performance. A second group of assessors (the control condition) would not be given any expectancy information. Thus, overall, there would be four different conditions (expectancy/new teaching strategy, expectancy/traditional method, no expectancy/new teaching strategy, no expectancy/traditional method). By combining these two variables into a 2 X 2 factorial, this paradigm allows one to assess whether an expectancy effect is present and to compare that effect with the effect of the new teaching strategy on students' mathematical performance.

Purpose of the Present Study

The present study was designed to investigate whether the undermining effect of reward on intrinsic motivation is a result of experimenter expectancies rather than external reward. The present study combined an extension of the basic expectancy control design with the typical paradigm used to investigate the effects of reward on intrinsic motivation. The design was a 2 X 3 factorial with two levels of reward (reward, no-reward) and three levels of experimenter expectancy (a positive expectancy about reward, a negative expectancy, or no expectancy). University undergraduate participants worked on an interesting activity, solving puzzles. One group was offered a reward to engage in the task, a second group was not offered a reward to do the task (control group). After the reward was delivered, the time participants continued to work on the task during this non-reward phase, their performance on the task during the free-choice period, as well as questionnaire measures of task interest, served as measures of intrinsic motivation.

Participants also responded to questionnaires designed to assess perceptions of self-determination, competency, levels of anxiety, and task difficulty. In addition, performance on the task was measured during the intervention phase.

To investigate experimenter expectancy, one group of "experimenters" was told to expect an undermining effect of reward, another group of "experimenters" was told to expect an enhancing effect of reward, and a third group of "experimenters" was given no expectancy (control group).

If the effects of rewards on intrinsic motivation are due to the reward contingency rather than experimenter expectancy, the results should show a main effect of reward. That is rewarded participants should spend less time on the task during the free-choice period, their performance should be lower, and task interest should be less than for non-rewarded participants. In addition, rewarded participants should report decreases in self-determination, and competency relative to non-rewarded participants. These findings would offer support for CET.

If the results indicate an interaction effect of expectancy by reward on intrinsic motivation then (a) rewarded individuals paired with experimenters who have been given a positive expectancy about the effects of reward should work on the task longer than non-rewarded individuals during the free-choice period, perform at a higher level, and report greater interest in the task, (b) rewarded participants who are run by "experimenters" given the negative expectancy should spend less time on the task during the free-choice period, perform at a lower level, and report less task interest compared to non-rewarded participants, and (c) rewarded and non-rewarded individuals run by experimenter given no expectation about reward should perform in line with these experimenters own view on the effects of reward on motivation and liking.

All participants answered questions to assess whether the verbal and nonverbal behaviors allegedly associated with experimenters who communicate the expectancy effect were present during the experiment. Specifically, experimenters given the positive and negative expectancies about the effects of

reward on intrinsic motivation should be perceived by participants as exhibiting greater verbal and non-verbal behaviors than the experimenters given no expectancy about the effects of reward.

CHAPTER 2

LITERATURE REVIEW

Most of the research on rewards and intrinsic motivation has emerged from a cognitive orientation with emphasis placed on thought processes. From this perspective, it is generally accepted that animals do not have the same cognitive abilities as humans; therefore, the essence of human motivation is seen to be quite different from that of nonhumans. Because of this, attempts to understand the phenomenon of intrinsic motivation have focused primarily on findings from experimental studies with human participants. One problem in human experimental research is experimenter expectancy effects, which depends on the expectations and hopes of the experimenter. Expectancy effects can become significant determinants of data by causing subtle but systematic differences in the treatment of participants (Rosenthal, 1966). In other words, the results in experimental research may be due to experimenter expectations rather than the treatment variable if methodological controls are not implemented to limit those effects.

Effects of Reward on Intrinsic Motivation

The first clue that the effects of rewards on intrinsic motivation may be due to experimenter expectancies is that the bulk of experimenters get results that are consistent with their hypotheses. That is, when researchers predict negative effects of reward on intrinsic motivation, they find negative effects. On the other

hand, when researchers predict no negative effects of reward on intrinsic motivation, they find no negative effect or positive effects.

In Table 2.1, forty-three articles (reporting 51 independent experiments) on rewards and intrinsic motivation are summarized. Because the present study focused on the effects of tangible rewards offered merely for doing a task, the studies reviewed here all used this type of reward contingency. Thus, in each of the studies presented in Table 2.1, participants in the reward conditions were offered and given a tangible reward simply for doing the task, without regard to any performance standard. For each study, a rewarded group was compared to a no-reward control group on measures of intrinsic motivation.

For each study, Table 2.1 presents (a) the theoretical position of the researcher(s), (b) their prediction as to whether rewards would decrease, increase, or have no effect on intrinsic motivation, and (c) the direction of the effects obtained on the free-time (time spent on the task during the free-choice period) and/or attitude measures (self-reports of task interest, enjoyment and satisfaction) of intrinsic motivation. None of the studies reviewed here included a measure of performance during the free-choice period.

Theoretical Orientations

In terms of theoretical orientations, there were three major positions: cognitive evaluation theory, the overjustification hypothesis, and behavioral theory. A brief explanation of each of these theoretical positions and their

predictions about the effects of reward on intrinsic motivation are presented below.

The most comprehensive account of negative effects of reward comes from cognitive evaluation theory (CET). According to CET, when people like doing things, they feel competent and self-determined and their intrinsic motivation level is high. When people are rewarded for doing an activity, CET asserts that the reward will be experienced as controlling and will reduce a person's self-determination and perceived competence. This, in turn, will decrease an individual's intrinsic motivation. In order to make predictions about the effects of reward on intrinsic motivation, Deci et al. (1999) suggest it is necessary to consider whether the reward is expected, and if so, upon what specific behaviors it is made contingent. If rewards are not expected or are not contingent on performing the task, CET predicts that the reward will not be experienced as controlling or informational (confirming one's competence). However, when rewards are offered for doing a task, independent of whether it is completed or done according to a performance standard, CET predicts decreases in people's intrinsic motivation. This is because people are likely to experience the rewards as a controller of their behavior. The result will be a decrease in feelings of competence and self-determination, and intrinsic motivation will be undermined.

The overjustification hypothesis (Lepper, Greene, & Nisbett, 1973) makes predictions about the effects of reward on intrinsic motivation similar to those

made by CET. However, according to the overjustification hypothesis (OJH), the effect of the reward depends on people's attributions of their own behavior (whether they attribute their behavior to internal or external causes). If a person engages in a behavior and the external contingencies controlling that behavior are salient, unambiguous, and sufficient to explain it, the person attributes his/her behavior to the external contingency. On the other hand, if the controlling contingencies are unclear, the person attributes his/her behavior internally, to his/her own character, interests, and desires.

The overjustification hypothesis emerges from self-attribution theory (Bem, 1965; Kelly, 1967). When people are offered external rewards to engage in a task where, previously, intrinsic interest was the only principal attribution, they will attribute the motivation for their behavior to the external incentive. When the rewards are removed, their intrinsic motivation will decline. In sum, both CET and OJH predict negative effects of tangible rewards when the rewards are offered to individuals for engaging in or doing an activity.

Behavioral theory does not make specific predictions about the effects of rewards on intrinsic motivation. From a behavioral perspective, rewards and reinforcers are distinct. Behavioral theory hypothesizes that if an external incentive (reward) increases the likelihood of a behavior occurring again in similar circumstances, the incentive acts as a reinforcer. If an external reward functions as a reinforcer, it will continue to produce the desired behavior. Thus, in the behavioral studies, the researchers first demonstrate that the incentives

offered for performing the task act as reinforcers. If the rewards function as reinforcement, no undermining of intrinsic motivation is predicted.

Predictions of the Researchers

The first noteworthy observation from Table 2.1 is that of the 51 experiments examined, the majority of researchers adopted a CET or the OJH position. Of the 51 studies, 48 (94%) came from a CET or OJH position, one study (2%) was exploratory and the researcher did not specify a theoretical position (Perry, Bussey, & Redman, 1977), and two studies came from a behavioral position (4%).

As noted above, both CET and the OJH predict that rewards offered to people simply for doing a task will result a in decrease on measures of intrinsic motivation. As can be seen in Table 2.1, however, under some conditions, researchers adopting these perspectives predicted no decrease or an increase in intrinsic motivation measures. When the researchers held a CET or OJH position and predicted that rewards would not decrease or would increase intrinsic motivation, explanations of the hypotheses are described in the Notes to Table 2.1. For example, Boggiano, Ruble, and Pittman (1982) investigated the effects of rewards on challenging and unchallenging activities. These researchers hypothesized an increase in intrinsic motivation for rewarding participants for doing an unchallenging activity and a decrease for challenging activities. Ross (1975) investigated the effects of reward saliency on intrinsic motivation. He

predicted a decrease if the reward was salient, but hypothesized no decrease of intrinsic motivation for children for whom the reward was hidden from their view.

Of the 48 studies guided by CET and OJH, there were 54 experimental hypotheses about the effects of reward on measures of intrinsic motivation. Of the 54 hypotheses guided by CET and OJH, 44 hypotheses (81%) predicted decreases, three (6%) predicted increases, three (6%) predicted no decrease, and four (7%) did not state a prediction.

Findings of the Research

Fifty, of the 54 hypotheses guided by CET and OJH made explicit predictions about the effects of reward on intrinsic motivation (see Table 2.1). To test these 50 hypotheses, there were 45 free-time measures and 31 attitude measures taken. For the 45 free time measures, the results from 42 (93.3%) of the studies supported the predictions made by the researchers, one (2.2 %) result did not support the hypothesis, and two (4.4%) of the studies did not provide sufficient information about the free-time measure. For the 31 attitude measures coming from a CET or OJH perspective, 16 (52%) were in accord with the predictions, four (13%) did not support the predictions, and 11 (35%) of the studies did not report information about the attitude measure.

Table 2.1 shows that two studies were conducted from a behavioral position. Both hypotheses predicted no decrease on free-choice intrinsic motivation; both studies obtained a positive effect of reward on intrinsic motivation thus supporting the hypotheses. One study that was exploratory

(Perry, Bussey, & Redman, 1977) predicted that rewards would decrease intrinsic motivation; the results indicated a negative effect of reward on both free-time and self-report measures.

Overall, Table 2.1 shows that regardless of the theoretical orientation of the researchers or the predictions made, the results of the free-time measure are most often in accord with the predictions made by the researchers. Including all the studies that made explicit predictions about the effects of reward on intrinsic motivation (those from CET, OJH, behavioral orientations and including the exploratory study) there were 48 free-time measures and 32 attitude measures. Of the 48 free-time measures, 45 (94%) obtained results in accord with what was predicted. Only one study (2%) did not find evidence from the free-time measure to support the prediction, and two studies (4%) did not give sufficient information about the free-time measure. With the 32 attitude measures, 17 (53%) of the studies found evidence that coincided with the experimenters' predictions. One study (3%)did not find results as hypothesized. Three (9%) found no effect. Eleven (34%) did not provide sufficient information to draw conclusions about the attitude measure.

Clearly, the majority of the results of the free-time measure supported the predictions made by the researchers. In addition, over half of the predictions were supported by the attitude measure of intrinsic motivation. The observations from the free-time measure suggest that the effects of reward on intrinsic

motivation (negative and positive) may be the result of experimenter expectancies and not the reward.

Experimenter Expectancies as an Explanation for the Findings

Research on the Experimenter Expectancy Effect

The earliest studies were conducted with human participants. Experimenters instructed the participants to rate photographs of people as to whether the people in the pictures had recently experienced success or failure. Half the experimenters were led to expect high ratings and half were led to expect low ratings. The results indicated that experimenters expecting high ratings obtained substantially higher ratings than experimenters expecting low ratings (Rosenthal & Fode, 1963a).

To investigate the generality of these interpersonal expectancy effects in the laboratory, two studies employing animal subjects were conducted (Rosenthal & Fode, 1963b; Rosenthal & Lawson, 1964). Half the experimenters were told their rats had been specially bred for good maze performance (Rosenthal & Fode, 1963b) or for lever pressing (Rosenthal & Larson, 1964) and half were told their rats had been specially bred for poor maze (or lever pressing) performance. In both experiments, when experimenters had been led to expect better learning from their rats, they obtained faster performance. These studies provided further support for the experimenter expectancy effect.

Rosenthal and Jacobson (1968) then examined whether expectations held by teachers could influence the intellectual development of their students. All of

the children in the study were administered a nonverbal test of intelligence, which was disguised as a test that would predict intellectual "blooming." The test was labeled "The Harvard Test of Inflected Acquisition." There were 18 classrooms in the school, three at each of the six grade levels. Within each grade level, the three classrooms were composed of children with above-average ability, average ability, and below-average ability, respectively. Within each of the 18 classrooms, approximately 20% of the children were chosen at random to form the experimental group. The teachers of these children were told that the students' scores on the "Test of Inflected Acquisition" indicated they would show surprising gains in intellectual competence during the next 8 months of school. The only difference between the experimental group and the control group children, then, was that the teachers were told that the experimental participants would excel.

At the end of the school year, 8 months later, all the children were retested with the same test of intelligence. Overall, the children from whom the teachers had been led to expect greater intellectual gain showed a significantly greater gain than did the children of the control group, thereby supporting the expectancy effect hypothesis (Rosenthal & Jacobson, 1968).

Since the late 1950's, over 400 studies have been conducted that have demonstrated that interpersonal expectancy effects occur in both experimental and applied situations.

Explaining the Expectancy Effect

Variables such as sex, age, and personality of the experimenter have

been shown to influence the size of the experimenter expectancy effect (Rosenthal, 1966). For example, male experimenters have been found to unintentionally bias data collected from both male and female participants, and to exert significantly greater expectancy effects upon acquainted than upon unacquainted participants. In addition, experimenters who (a) are rated as more professional in manner (businesslike, expressive voice, professional, lots of use of legs), (b) appear to participants as high status researchers, and (c) have one-to-one contact with their participants are those who exert the greatest expectancy effects upon their participants.

Several nonverbal behaviors emitted from experimenters such as eye contact, smiles, and nods have also been found to influence expectancy effects (Harris & Rosenthal, 1985). That is, higher rates of these behaviors produce the greatest experimenter expectancy effects. Other cues believed to be important in the communication of experimenter expectancies such as speech rate and tone-of-voice remain relatively unexplored (Harris & Rosenthal, 1985). It may be that these are important variables in communicating experimenter expectancies.

Potential Sources of Experimenter Bias

According to studies of expectancy effects (Harris & Rosenthal, 1985; Rosenthal 1966), there are several ways in which expectancies can be communicated to participants. Experimenter expectancies can be communicated through visual and/or auditory channels any time an experimenter comes into contact with participants (e.g. greeting the participant at the laboratory, reading

the task instructions, etc.). In the reward and intrinsic motivation studies, task instructions, the offer of the reward, and the excuse made to participants to set up the free choice period are given orally to participants by an experimenter who usually is not blind to the experimental hypotheses or participants' conditions. As noted, tone of voice and rate of speech have been shown to influence the expectancy effect, but little has been done to estimate the relative importance in comparison with nonverbal behaviors. It may be that instances during the experiment when experimenters speak with participants or are seen by participants are the most important situations for communicating researchers' expectancies.

In the rewards and intrinsic motivation literature, some researchers have tried to control for potential sources of bias by removing the experimenter from the room during the experimental session (Ryan, Mims, & Koestner, 1983) and by having a person who is blind to conditions record the free time measure (Deci, 1972; Lepper, Sagotsky, Dafoe, & Greene, 1982; Morgan, 1983). However, there is no study to date in which the experimenter has taken all possible precautions to completely control for the communication of experimenter expectancies, especially at the stage immediately preceding the free-choice phase.

Rosenthal (1966) suggests that any time an experimenter comes into contact with a participant, there is an opportunity for the communication of an expectancy. In the rewards and intrinsic motivation studies, there are several opportunities for the researcher(s) to communicate expectancies. Additionally,

there are other procedures in the studies that need to be controlled for in order to prevent experimenter bias. In Table 2.2, six elements that need to be controlled for in the reward and intrinsic motivation studies are identified; in each of these situations, there was a possibility of introducing bias. Specifically, the situations include (a) whether the experimenter was present during the experiment, (b) whether the experimenter was blind to the hypotheses, (c) whether the experimenter was blind to the conditions, (d) whether the experimenter orally gave instructions to participants, (e) whether participants were told about the free-choice period, and (f) whether the free-time measure was recorded by hand or videotaped.

In Table 2.2, 37 articles (reporting 44 independent studies) are summarized. For each study, Table 2.2 indicates whether or not the studies implemented controls for any of the six possible sources of bias described above. For each study in Table 2.2, rewarded participants were offered a tangible reward for doing a task and compared to non-rewarded participants on the free-time measure of intrinsic motivation. Only studies that used a free-time measure are included in Table 2.2; no analysis was conducted with studies using an attitude measure. This is because studies using a free-time measure presented more opportunities for the experimenters' to communicate their expectancies.

The first observation from Table 2.2 is that of the 44 studies reviewed, the experimenter was present during the session in 41 of the studies (93%). This high degree of contact between experimenters and participants provided ample

opportunity to unintentionally convey the expected outcome of the studies. Only 2 of the studies (5%) controlled for this source of bias and one study (2%) did not report information as to whether controls were implemented.

Table 2.2 demonstrates that of the 44 studies, only 6 studies (14%) employed experimenters who were blind to the experimental hypotheses. In 31 studies (70%), the experimenters were aware of the intended outcome of the research. Seven studies (16%) did not report whether or not experimenters were blind to the hypotheses. Similarly, only 2 studies (5%) employed experimenters who were blind to the participants' conditions. In 36 studies (almost 82%), experimenters knew if the participants were in a reward or no-reward condition, and 6 studies (14%) did not report this information. The high percentage of studies that did not employ experimenters who were blind to participants' conditions or the experimental hypotheses provides another possible source of evidence to suggest that experimenter expectancies could have been communicated.

As noted, tone of voice and rate of speech may be important in the communication of expectancies, but these factors have been relatively unexplored in the research on experimenter expectancies. Of the 44 studies listed in Table 2.2, the experimenters presented the instructions to the participants orally in 42 of the studies (96%). Only one study (2%) controlled for this potential source of bias by having participants listen to tape-recorded instructions. One study (2%) did not report how the instructions were presented

to participants. In addition, in 30 of the studies (68%) experimenters set up the free-choice period with verbal instructions. That is, participants were told that the experimenter needed to leave for a short time; participants were instructed to do what they wanted while the experimenter was gone. In 11 studies (25%), no excuse was given to participants; in 3 studies (7%) the information was not provided. These two uncontrolled variables, delivery of instructions and the free-time setup provide further evidence to suggest that the results of the studies might be due to experimenter expectancies.

The final source of bias presented in Table 2.2 is the opportunity for the free-choice period to be unintentionally biased by hand-recording the time participants continued to work on the task during the free-choice period. Of the studies reviewed, 32 free-time measures (73%) were recorded by hand. Seven studies (16%) videotaped the free-choice period, and 5 studies (11%) did not report how this dependent measure was recorded. Generally, in the studies on reward and intrinsic motivation, Table 2.2 demonstrates that the bulk of studies did not implement controls to avoid communication of the outcome of the experimental hypotheses.

The most important elements necessary to eliminate bias are whether or not experimenters were blind to the hypotheses and the experimental conditions. Of the 44 experiments in Table 2.2, only 4 studies (9%) controlled for these sources of bias (Lepper et al., 1973; Morgan, 1981, Experiment 1 and 2; Morgan, 1983, Experiment 1). In other words, in 91% of the studies listed in Table 2.2,

the experimenters were not blind to the hypotheses and condition. This suggests that in most of the studies examined, there were many opportunities to communicate the expectations of the researchers. The implication is that in most of the studies on rewards and intrinsic motivation, the results may reflect experimenter expectancies about rewards rather than the effect of reward per se.

Findings When Experimenter Bias Was Controlled

The third observation that suggests the results of the studies on reward and intrinsic motivation may be due to experimenter expectations comes from an examination of the first studies on reward and intrinsic motivation conducted by Deci (1971, 1972). In the original study designed to assess the undermining effect of reward, Deci (1971) hypothesized that if a person received money for performing an interesting activity, the degree to which that person would be motivated to perform the activity would decrease. In Deci's study, university students attended three sessions in which they worked on assembling puzzles. During the second session, half of the participants were offered a reward for each puzzle they were able to solve within a 13-minute period. To obtain the free-choice measure of intrinsic motivation, the experimenter left the room for 8 minutes in the middle of each session. The time spent on the task without reward was assessed between groups. Also, at the end of each session, the participants were asked to rate on a 9-point scale the degree to which they found the task interesting and enjoyable (the self-report measure).

Deci compared the amount of time in the 8-minute free choice period between the first and the third session for each participant and compared the differences between the rewarded and non-rewarded participants. Deci found that participants rewarded before the free time period spent less time on the task in the free-choice period than the non-rewarded group ($p < .10$, one-tailed). There were no significant differences between the groups or among the sessions for the self-report measure of intrinsic motivation. Although Deci's self-report findings were not significant and the free-time findings did not reach the customary .05 statistically significant level, Deci stated, "...when money is used as an external reward for some activity, the subjects lose intrinsic motivation for the activity" (p. 114).

In the book, Intrinsic Motivation and Self-determination in Human Behavior (Deci & Ryan, 1985), the authors pointed out that there were two potential weaknesses in Deci's original work: (a) the experimenter was present in the room with participants during the puzzle-sessions, thus providing an opportunity for transmitting an expectancy, and (b) the person recording the free time measure was not blind to the conditions and could have unintentionally biased the recording of time. Deci stated that to correct these two weaknesses, he "redesigned the procedure and replicated the results of the undermining of intrinsic motivation by monetary payments (Deci & Ryan, 1985, p. 46)" in a study he conducted in 1972 (Deci, 1972).

An examination of Deci's 1972 study, in which he controlled for the two sources of bias described above, is revealing. In the 1972 study, Deci hypothesized that "when a person is rewarded with money for performing an intrinsically motivating activity, his intrinsic motivation will decrease (p. 115)". Deci also hypothesized that "when a person who is performing an intrinsically motivated activity feels inequitably overpaid, he will increase his performance"(p. 115).

In this study, university students participated in one session in which they solved puzzles. In contrast to Deci's 1971 study, in this experiment, the experimenter was not present in the room during most of the experimental session. The experimenter communicated with participants via an intercom. Half of the participants were offered a reward for each puzzle they could solve within a 10-minute time limit and half were not offered a reward. Following the puzzle solving, half of those participants who were offered a reward were paid. The experimenter then left his position for 8-minutes under the pretense that he needed to get a questionnaire to assess how the participants had solved the puzzles. When the experimenter left, he signaled to a second experimenter, blind to the experimental conditions, to record the 8-minute free-time measure. After this, the first experimenter returned to the room and paid the other half of rewarded participants. Participants, then, completed a questionnaire. Thus, in this study, there were two rewarded groups and a non-rewarded control group.

One group was paid prior to the free-choice measure (as in Deci, 1971), and one group was paid after the free-choice measure.

Deci claimed that this study provided "strong support to the cognitive evaluation theory of the effects of external rewards on intrinsic motivation" (p. 118). A careful look at the results, however, indicates that those who were rewarded prior to the free-choice period, the typical procedure, spent more time working on the task compared to the control group (Means = 392.8 and 189.3, respectively); there was no statistically significant difference between control participants and those rewarded after the free choice period (Means = 189.3 and169.4, respectively). In other words neither of the rewarded conditions showed a decrease in intrinsic motivation relative to non-rewarded controls. Thus, although Deci claimed that his study supported CET, his results did not support the claim.

The point is that when Deci (1972) controlled for experimenter expectancies, no negative effects of reward on intrinsic motivation were detected. Nonetheless, Deci claimed that "when money is given 'as an external reward,' the controlling aspect is clearly the strongest and leads to a decrease in intrinsic motivation" (p. 118). Clearly, what the results indicate is that when some possible sources of experimenter bias are controlled, there is no negative effect of reward. This observation also suggests that the negative findings in Deci's (1971) earlier study may have been the result of an experimenter expectancy effect, not the effect of reward. This interpretation has not received attention. Instead, Deci's

studies generated a great deal of research addressing the negative effects of reward on intrinsic motivation.

This review of the literature suggests that the findings of the research on rewards and intrinsic motivation may be due to experimenter expectancies rather than the negative effect of reward contingencies. First, even when researchers use similar design procedures to investigate the phenomenon, the experimental findings (positive and negative) are usually in the direction of the predictions made by the theoretical position held by the researchers. Second, the majority of the studies on the topic did not implement controls for the communication of expectancies. Finally, a careful examination of the early studies by Deci (1971, 1972) shows that when sources of bias were removed, Deci (1972) did not find an undermining effect of reward.

I have suggested that the negative effects of rewards on intrinsic motivation found in the studies reviewed might be due to experimenter expectations, rather than to the effects of reward. Given this possibility, it is important to understand how and why the researchers might have communicated their expectancies. As noted in earlier, there are several ways that expectancies can be communicated that have been identified in the literature (e.g., through the use of hand and body gestures, smiles, degree of professionalism, etc.). A less explored issue, however, is why expectancies are communicated.

Although researchers may have certain expectations about how participants should behave or about what the results should look like, these

factors may not be sufficient to motivate the researchers to communicate their expectancies during an experiment. In order to understand why people might inadvertently communicate their expectancies, it is important to examine studies that are directly concerned with experimenter expectancy effects. In this section, a selected literature on expectancy effects is examined. As previously discussed, there are over 400 studies on experimenter expectancies. For the purpose of this review, 3 of the original experiments with human participants (conducted by Rosenthal and his colleagues) are examined. The goal is to determine when and under what conditions people are likely to communicate expectancies. Specifically, the focus is on determining the motivational context of studies where people communicate expectancies.

Why Expectancies Might Be Communicated

The initial studies on the topic were conducted by Rosenthal and Fode, in the early 1960's and are reported in Rosenthal and Fode (1963a). In the first study, ten students in an undergraduate experimental psychology class were recruited to act as experimenters. These experimenters were told that they were going to attempt to replicate well-established experimental findings just as "students in physics labs are expected to do" (Rosenthal & Fode, 1963a: p. 494). The experimenters' task was to give undergraduate participants (from an introductory psychology class) a photo-rating task. Two hundred and six participants were asked to rate 10 photographs of people on a scale of –10 to +10 on whether or not the people in the photos had recently experienced failure

or success. Half of the experimenters were told to expect average ratings of +5 from their participants; half of the experimenters were told to expect average ratings of –5. Each experimenter ran 18 to 24 participants.

The experimenters were paid one dollar per hour and were told that if they did a good job they would be paid double. Specifically, there were told, "if your results come out properly – as expected – you will be paid $2.00 instead of $1.00" (Rosenthal & Fode, 1963; p. 507). Course grades were not affected by the experimenters' participation. The results of the study came out as predicted. Participants run by experimenters who expected positive ratings rated the photos significantly higher than those in the group run by experimenters who expected negative ratings.

These findings were replicated in two subsequent experiments (Rosenthal & Fode, 1963a, Experiment 2 and 3). In each of these studies, a photo rating task was used, experimenters were students in advanced psychology classes, experimenters were assigned to a positive or negative expectancy condition, and each experimenter ran several participants through the study. In addition, experimenters were informed that they would be attempting to replicate will-established findings and they were all told that they would be paid. In one of the experiments (Rosenthal & Fode, 1963a, Experiment 3), the experimenters were paid differently; one group received a higher amount than the other. This difference in pay did not affect the findings.

There are several elements to these studies that may have been conducive to motivating experimenters to communicate the expectancies. First, in each study, the experimenters were told that the purpose was to replicate "well-established" findings. Instructions such as these may have had a strong impact on how the experimenters went about conducting the research. Since most of the student experimenters were graduate students, it would probably have been important for them (and their future aspirations) to be able to obtain findings that were said to be "well-known". Thus, this is one factor that may have motivated the "experimenters" to convey their expectancies.

A second point is that in two of the studies reviewed here, the experimenters were paid and they were offered more pay if they found the "proper" results. Clearly, the possibility of earning double pay ($2.00 per hour) would have been a strong motivator for students in the 1960's. The point is that under these conditions, student "experimenters" would have had a strong interest in obtaining good results and would thus, be likely to communicate their expectancies.

Another observation from the studies reviewed here is that the experimenters all ran several participants. This strategy may have allowed for the experimenters to get comfortable with the procedures of the study. Furthermore, by running several participants, the experimenters had several opportunities to communicate their expectancies and to be able to produce the desired results, on average.

In sum, in the three studies reviewed here, an examination of the context suggests that expectancies were communicated when (a) the experimenters were graduate students, (b) they were told that they would be replicating well-known research, (c) they were offered double pay to obtain the "proper" findings, and (d) each experimenter ran more than one participant through the procedure.

There are several other procedures that could also affect the communication of expectancies. One possibility is that experimenters will be more likely to communicate their expectancies when the principal investigator is seen as a person with authority and prestige. Students of Rosenthal may have seen him this way and may have been highly motivated to please him. Also, when the experimenters are graduate students and they are able to obtain expected results, they may gain admiration and envy from their fellow graduate students. The impressions they make on other graduate students could be a strong influence. Finally, getting credit or grades for conducting research may be another motivating factor. Although none of the experimenters received grades for their participation in the studies reviewed here, this may still be a possible source of motivation.

In terms of the studies on rewards and intrinsic motivation, some of the factors discussed above may have influenced the experimenters to communicate their expectancies. In the majority of the experiments on rewards and intrinsic motivation (reviewed in Tables 2.1 and 2.2), the experimenters were graduate students. As such, it was probably important for them to do a "good" job

conducting the study. In addition, the researchers ran several participants. This gave them many opportunities to communicate their expectancies and to obtain the results they predicted.

Following Deci's (1971) and Lepper et al.'s (1973) publications, the view that rewards destroy intrinsic motivation became popular. Many textbooks (e.g., Zimbardo & Ruch, 1975) and journal articles (e.g., Levine & Fasnacht, 1974; Notz, 1975) began to warn practitioners, teachers, employers, and parents about the dangers of using rewards to motivate performance. These articles had a great deal of influence and the undermining effect began to be seen as a well-established finding.

In the reward and intrinsic motivation studies, it is not evident that the researchers were told explicitly that they were going to replicate well-known findings. However, the graduate students were getting their Ph.D.'s based on their findings. Thus, the researchers were probably well aware of the undermining effect phenomenon and were expected to replicate those well-known studies. In the behavioral studies, the principal investigators were interested in showing that reinforcement and reward were not synonymous and, that when rewards functioned as reinforcement, no undermining effects would be found. Given this view, it is likely that the researchers in these experiments also had a strong interest in communicating their expectancies.

Each of these factors alone or in combination may have contributed to the communication of expectancies in the rewards and intrinsic motivation

experiments. As such, it is important to directly examine whether experimenter expectancies can impact the effects of reward on intrinsic motivation.

The Present Study

This study was designed to investigate whether the effects of rewards on intrinsic motivation could be due to experimenter expectancies. The study employed the general paradigm used to assess the effect of rewards on intrinsic motivation (Deci 1972; Lepper et al., 1973). In addition, the design incorporated a variation of the expectancy control design (Rosnow & Rosenthal, 1999). This type of design allowed for an evaluation of experimenter expectancies on intrinsic motivation separate from the effects of reward. The design was a 3 X 2 factorial. There were three levels of experimenter expectancy (an expectation that reward produces positive effects, an expectation that reward produces negative effects, or no expectation about the effects of reward) and two levels of reward (reward or no-reward).

Possible Outcomes

On measures of intrinsic motivation, there are several possible outcomes. First, if the effect of reward is not due to expectancy, then I should obtain data that is in accord with CET and OJH and that demonstrates a main effect of reward. Essentially, rewarded individuals will spend less time on the task during the free-choice period, have poorer performance scores and lower task interest than non-rewarded participants. In addition, rewarded participants will report

lower feelings of competency, lower feelings of self-determination, and higher anxiety levels than non-rewarded participants.

On the other hand, if the effects of reward are influenced by experimenter expectancies, the data should result in an interaction between reward and experimenter expectancy. Specifically, rewarded participants paired with an experimenter in the positive-expectancy condition should spend more time on the task than the non-rewarded participants during the free choice period. They should also perform at a higher level, and report high task interest. In addition, participants paired with an experimenter in the positive-expectancy reward condition would be expected to report greater feelings of competency and self-determination, and less anxiety than participants who do not receive a reward. For the negative-expectancy condition, non-rewarded individuals should spend more time on the task during the free-choice period, produce higher task performance, and report greater task interest than rewarded participants. Non-rewarded individuals should also report greater feelings of competency and self-determination and lower anxiety than rewarded participants. Given an interaction between reward and expectancy, participants in the no-expectancy group should demonstrate behavioral and attitude measures that fall in the middle of the negative and positive expectancy groups.

Previous research on experimenter expectancies has found that their participants viewed experimenters who produced the greatest expectancy effects as friendlier and slower speaking. The experimenters also used more hand,

head, and leg gestures (Rosenthal, 1966). Thus, if there is an expectancy effect, the data should demonstrate a main effect of expectancy on these measures. Specifically, participants in the positive and negative expectancy conditions will rate their experimenters higher on these measures compared to the participants in the no-expectancy group.

Table 2.1

Predictions and Direction of Effects from Studies in which Rewards were Offered for Doing the Task

Study	Theoretical Position	Prediction	Free-choice	Attitude
Amabile, T. M., Hennessey, B. A.., & Grossman, B. S. (1986). Experiment 1.	OJH	Decrease	ID	ID
Amabile, T. M., Hennessey, B. A.., & Grossman, B. S. (1986). Experiment 3.	OJH	Decrease	--	ID
Anderson, R., Manoogian, S. T., & Reznick, J. S. (1976).	OJH	Decrease	Negative	--
Arnold, H. J. (1976).	OJH	Decrease	--	0.00
Arnold, H. J. (1985).	OJH	Decrease	--	Negative
Boggiano, A. K., Harackiewicz, J. M., Besette, J. M., & Main, D. S. (1985).	CET	Decrease	Negative	--
Boggiano, A. K., & Ruble, D. N. (1979).	CET	Decrease	Negative	--
Boggiano, A. K., Ruble, D. N., & Pittman, T. S. (1982).	CET	Decrease	Negative	--
	CET	Increase[a]	Positive	--
Brennan, T. P., & Glover, J. A. (1980).	Behavioral	No Decrease	Positive	--
Chung, K. T. (1995).	OJH	Decrease	Negative	--
Danner, F. W., & Lonkey, E. (1981). Experiment 2.	CET	Decrease	Negative	Negative
DeLoach, L. L., Griffith, K., & LaBarba, R. C. (1983).	OJH	Decrease	ID	--
Fabes, R. A., Eisenberg, N., Fults, J., & Miller, P. (1988).	CET/OJH	Decrease	Negative	Negative

Fabes, R. A., Fults, J., Eisenberg, N., May-Plumlee, T., & Christopher, F. S. (1989).	CET/OJH	Decrease	Negative	--
Fabes, R. A., McCullers, J. C., & Hom, H. L. Jr. (1986).	CET/OJH	Decrease	Negative	Negative
	CET/OJH	No Decrease[a]	Positive	Positive
Feehan, G. G., & Enzle, M. E. (1991). Experiment 1.	CET/OJH	Decrease	Negative	--
Greene, D., & Lepper, M. R. (1974).	OJH	Decrease	Negative	--
Hamner, W. C., & Foster, L. W. (1975).	CET	Decrease	--	Negative
Harackiewicz, J. M. (1979).	CET	Decrease	--	Negative
Hitt, D. D., Marriot, R. G., & Esser, J. K. (1992).	CET	Decrease	Negative	Negative
Karniol, R., & Ross, M. (1977).	OJH	Decrease	Negative	--
Lepper, M. R., Greene, D., & Nisbett, R. E. (1973).	OJH	Decrease	Negative	--
Lepper, M. R., Sagotsky, G., Dafoe, J. L., & Greene, D. (1982). Experiment 3.	OJH	Decrease	Negative	--
Loveland, K. K., & Olley, J. G. (1979).	OJH	Decrease	Negative	--
Morgan, M. (1981). Experiment 1.	OJH	Decrease	Negative	Negative
Morgan, M. (1981). Experiment 2.	OJH	Decrease	Negative	Positive
Morgan, M. (1983). Experiment 1.	OJH	Decrease	Negative	Negative
Morgan, M. (1983). Experiment 2.	OJH	Decrease	Negative	0.00
Mynatt, C., Oakley, D., Piccione, A., Margolis, R., & Arkkelin, J. (1978).	Behavioral	No Decrease	Positive	--

Newman, J., & Layton, B. D. (1984).	OJH	Decrease	Negative	--
Ogilvie, L., & Prior, M. (1982).	OJH	Decrease	Negative	--
Okano, K. (1981). Experiment 1.	OJH	Decrease	Negative	Negative
Okano, K. (1981). Experiment 2.	OJH	Decrease	Negative	0.00
Perry, D. G., Bussey, K., & Redman, J. (1977).	Exploratory	Decrease	Negative	Negative
Pittman, T. S., Emery, J., & Boggiano, A. K. (1982). Experiment 1.	CET/OJH	Not Stated[a]	Positive	ID
Pittman, T. S., Emery, J., & Boggiano, A. K. (1982). Experiment 2.	CET/OJH	Not Stated[a]	Negative	--
Pretty, G. H., & Seligman, C. (1984). Experiment 1.	OJH	Decrease	Negative	Negative
Pretty, G. H., & Seligman, C. (1984). Experiment 2.	OJH	Decrease	Negative	Negative
Reiss, S., & Sushinski, L. W. (1975).	OJH	Decrease	Negative	ID
Ross, M. (1975). Experiment 1.	OJH	Decrease	Negative	Negative
	OJH	No Decrease[a]	Positive	ID
Ross, M. (1975). Experiment 2.	OJH	Decrease	Negative	ID
	OJH	Increase[a]	Negative	ID
Ross, M., Karniol, R., & Rothstein, M. (1976).	OJH	Decrease	Negative	--
Ryan, R. M., Mims, B., & Keostner, R. (1983).	CET	Decrease	Negative	ID
Sarafino, E. P. (1984).	OJH	Decrease	Negative	ID

Swann, W. B. Jr., & Pittman, T. S. (1977). Experiment 1.	OJH	Decrease	Negative	--
Swann, W. B. Jr., & Pittman, T. S. (1977). Experiment 2.	OJH	Decrease	Negative	--
Thompson, E. P., Chaiken, S., & Hazelwood, D. (1993).	CET	Decrease	Negative	Negative
	CET	No decrease	Positive	Positive
Tripathi, K. N., & Agarwal, A. (1988).	CET	Not Stated [a]	Positive	Positive
Tripathi, K. N. (1991).	CET	Not Stated [a]	ID	ID
Weiner, M. J., & Mander, A. M. (1978).	OJH	Decrease	Negative	ID
Williams, B. W. (1980).	OJH	Decrease	Negative	ID
	OJH	Increase [a]	Positive	ID

Note. OJH = Over justification hypothesis. CET = Cognitive evaluation theory. ID = Insufficient data (i.e. means and standard deviations not reported). Dashes indicate that the dependent measure was not assessed.

For predictions marked with superscript [a], an explanation of the prediction(s) is presented in "Notes to Table 2.2".

Table 2.2

Studies Where Rewards Were Offered for Doing the Task: Controls for Bias

Study	E Present During Session	E Blind to Hypothesis	E Blind to Conditions	Instruction Delivery	Free-time Setup	Free-choice Recording
Amabile, T. M., Hennessey, B. A., & Grossman, B. S. (1986). Experiment 1.	Yes	No	No	Orally	Orally	By Hand
Anderson, R., Manoogian, S. T., & Reznick, J. S. (1976).	Yes	No	No	Orally	Not Stated	By Hand
Boggiano, A. K., & Ruble, D. N. (1979).	Yes	No	No	Orally	Orally	By Hand
Boggiano, A. K., Ruble, D. N., & Pittman, T. S. (1982).	Yes	Not Stated	No	Orally	Orally	By Hand
Boggiano, A. K., Harackiewicz, J. M., Besette, J. M., & Main, D. S. (1985).	Yes	No	No	Orally	Orally	By Hand
Brennan, T. P., & Glover, J. A. (1980).	Yes	No	No	Orally	Orally	By Hand
Chung, K. T. (1995).	Not Stated	No	No	Not Stated	Not Stated	Taped
Danner, F. W., & Lonkey, E. (1981). Experiment 2.	Yes	No	No	Orally	Orally	By Hand
DeLoach, L. L., Griffith, K., & LaBarba, R. C. (1983).	Yes	No	No	Orally	Orally	Taped
Fabes, R. A., McCullers, J. C., & Hom, H. L. Jr. (1986).	Yes	No	No	Orally	Orally	Taped
Fabes, R. A., Eisenberg, N., Fults, J., & Miller, P. (1988).	Yes	No	No	Orally	Orally	By Hand
Fabes, R. A., Fults, J., Eisenberg, N., May-Plumlee, T., & Christopher, F. S. (1989).	Yes	No	No	Orally	Orally	By Hand

Feehan, G. G., & Enzle, M. E. (1991). Experiment 1.	No	No	Yes	Taped	Orally	By Hand
Greene, D., & Lepper, M. R. (1974).	Yes	No	No	Orally	No Excuse	By Hand
Hitt, D. D., Marriot, R. G., & Esser, J. K. (1992).	Yes	Not Stated	Not Stated	Orally	No Excuse	Not Stated
Karniol, R., & Ross, M. (1977).	Yes	No	No	Orally	Orally	By Hand
Lepper, M. R., Greene, D., & Nisbett, R. E. (1973).	Yes	Yes	No	Orally	No Excuse	Taped
Lepper, M. R., Sagotsky, G., Dafoe, J. L., & Greene, D. (1982). Experiment 3.	Yes	Not Stated	Not Stated	Orally	No Excuse	By Hand
Loveland, K. K., & Olley, J. G. (1979).	Yes	Not Stated	Not Stated	Orally	No Excuse	By Hand
Morgan, M. (1981). Experiment 1.	Yes	Yes	No	Orally	No Excuse	By Hand
Morgan, M. (1981). Experiment 2.	Yes	Yes	No	Orally	No Excuse	By Hand
Morgan, M. (1983). Experiment 1.	Yes	Yes	No	Orally	No Excuse	By Hand
Morgan, M. (1983). Experiment 2.	Yes	Not Stated	Not Stated	Orally	No Excuse	By Hand
Mynatt, C., Oakley, D., Piccione, A., Margolis, R., & Arkkelin, J. (1978).	Yes	Not Stated	Not Stated	Orally	Orally	Not Stated
Newman, J., & Layton, B. D. (1984).	Yes	No	No	Orally	Orally	By Hand
Ogilvie, L., & Prior, M. (1982).	Yes	Not Stated	Not Stated	Orally	Not Stated	Not Stated
Okano, K. (1981). Experiment 1.	Yes	No	No	Orally	No Excuse	Not Stated
Okano, K. (1981). Experiment 2.	Yes	Yes	No	Orally	No Excuse	Not Stated
Pittman, T. S., Emery, J., & Boggiano, A. K. (1982). Experiment 1.	Yes	No	No	Orally	Orally	By Hand

Pittman, T. S., Emery, J., & Boggiano, A. K. (1982). Experiment 2.	Yes	No	No	Orally	Orally	By Hand
Pretty, G. H., & Seligman, C. (1984). Experiment 1.	Yes	No	No	Orally	Orally	By Hand
Pretty, G. H., & Seligman, C. (1984). Experiment 2.	Yes	No	No	Orally	Orally	Taped
Reiss, S., & Sushinski, L. W. (1975).	Yes	Yes	No	Orally	Orally	By Hand
Ross, M. (1975). Experiment 1.	Yes	No	No	Orally	Orally	By Hand
Ross, M. (1975). Experiment 2.	Yes	No	No	Orally	Orally	Taped
Ross, M., Karniol, R., & Rothstein, M. (1976).	Yes	No	No	Orally	Orally	By Hand
Ryan, R. M., Mims, B., & Keostner, R. (1983).	No	No	No	Orally	Orally	By Hand
Sarafino, E. P. (1984).	Yes	No	No	Orally	Orally	By Hand
Swann, W. B. Jr., & Pittman, T. S. (1977). Experiment 1.	Yes	No	No	Orally	Orally	By Hand
Swann, W. B. Jr., & Pittman, T. S. (1977). Experiment 2.	Yes	No	No	Orally	Orally	By Hand
Thompson, E. P., Chaiken, S., & Hazelwood, D. (1993).	Yes	No	No	Orally	Orally	Taped
Tripathi, K. N., & Agarwal, A. (1988).	Yes	No	No	Orally	Orally	By Hand
Tripathi, K. N. (1991).	Yes	No	No	Orally	Orally	By Hand
Williams. B. W. (1980).	Yes	No	Yes	Orally	Orally	By Hand

Note. E = Experimenter.

Notes to Table 2.1

The prediction from the perspectives of cognitive evaluation theory and the overjustification hypothesis is that rewards will cause a decrease in measures of intrinsic motivation. These notes explain, under what conditions, researchers adopting these perspectives predicted no decrease or an increase in intrinsic motivation measures.

Boggiano, A. K., Ruble, D. D., & Pittman, T. S. (1982).	It was predicted that a reward would enhance interest for an unchallenging activity.
Fabes, R. A., McCullers, J. C., & Hom, H. L. Jr. (1986).	This study was designed to assess the replicability of negative reward effects across two different tasks, mazes and block design (algorithmic and heuristic, respectively). No negative effect on intrinsic motivation was predicted for the heuristic task.
Pittman, T. S., Emery, J., & Boggiano, A. K. (1982). Experiment 1.	There was no prediction made regarding the amount of time that participants would engage in any of the activities during the free choice period.
Pittman, T. S., Emery, J., & Boggiano, A. K. (1982). Experiment 2.	There was no prediction made regarding the amount of time that participants would engage in any of the activities during the free choice period.
Ross, M. (1975). Experiment 1.	No decrease of intrinsic motivation was expected for children for whom the reward was hidden from view.
Ross, M. (1975). Experiment 2.	An increase in intrinsic motivation was expected for children who thought about snow, rather than the reward.
Thompson, E. P., Chaiken, S., &	No decrease in intrinsic motivation was expected for

Hazelwood, D. (1993).	rewarded participants who initially scored low on "need for control" or "desire for control" scales.
Tripathi, K. N., & Agarwal, A. (1988).	No prediction made regarding the amount of time that participants would engage in the target task during the free choice period.
Tripathi, K. N. (1991).	No prediction made regarding the amount of time that participants would engage in the target task during the free choice period.
Williams, B. W. (1980).	An increase in intrinsic motivation was expected when the reward was attractive.

CHAPTER 3

METHODS

This research investigated the influence of experimenter expectancies on the effects of reward on intrinsic motivation. The study employed a variation of the basic expectancy control design (Rosnow & Rosenthal, 1999) combined with the general paradigm used to investigate the effects of reward on intrinsic motivation (Deci, 1971, 1972; Lepper et al., 1973). The design was a 3 X 2 factorial with three levels of experimenter expectancy (an expectation of positive effects of reward, an expectation of negative effects of reward, or no expectation about the effects of reward) and two levels of reward (reward or no-reward).

Students from undergraduate psychology classes were recruited for the study and assigned to pairs. One member of each pair was designated the "experimenter" in the study; the other was designated the research "participant". Each pair was randomly assigned to one of six experimental conditions. In the positive-expectancy conditions, the students who played the role of "experimenters" were given information indicating that rewards increase motivation and interest. In the negative-expectancy conditions, the information indicated that rewards reduce motivation and interest; and in the no-expectancy conditions, no expectation about the effects of rewards was given. Those designated as "participants" in each pair were either assigned to a reward or a no-reward condition.

In accord with the typical reward and intrinsic motivation study, each experimenter's role was to ask the participant to engage in a problem-solving task. The experimenters offered participants assigned to a reward condition

$5.00 to engage in the task; no-reward participants were not offered money to do the task. The rewarded participants were given the money after spending five minutes on the task. The experimenters then told participants that there would be a free-choice session where participants could do more problems or engage in an alternate activity.

The time "participants" spent on the problem-solving task during the free-choice session, their performance on the task in the free-choice period, and self-reported task interest were the measures of intrinsic motivation. "Participants" performance on the task during the treatment phase was also assessed.

"Participants" also completed questionnaires that assessed perceptions of self-determination, feelings of competence, task difficulty, feelings of anxiety, and how they perceived the "experimenters'" behavior. "Experimenters" completed questionnaires that assessed the effectiveness of the manipulation of the expectancy variable and their perceptions of their own behavior.

Pre-test of the Expectancy Information

Prior to conducting the experiment, to determine whether the information for the different expectancies conditions could be used to induce the desired expectancy, it was tested on a class of undergraduate psychology students. Thirty students from an introductory research methods class volunteered and consented to participate in the testing of the experimenter expectancy information.

Each participant was assigned to one of six expectancy conditions and given information to read that corresponded with that expectancy. In the positive-expectancy conditions, the participants read that when people are rewarded for

engaging in a task, their interest and motivation is enhanced. Five students in the positive-expectancy/reward condition were told that if people are rewarded for doing a task, they will spend about 6 minutes on it in an eight-minute free-choice period (without reward) and they will report high task interest. In the positive-expectancy/no-reward condition, six students were told that a non-rewarded person will spend about 2 minutes working on the task in a free-choice period and task interest will be low. In the negative-expectancy conditions, the students read that rewards reduce interest and motivation. Five students in the negative expectancy/reward condition read that rewards decrease interest and motivation and that a rewarded person would report low task interest and spend only 2 minutes on the task in a free-choice setting. Four students in the negative-expectancy/no-reward condition read that a non-rewarded person would spend about 6 minutes on the task and report high task liking. Ten students, five in each of the no-expectancy/reward and no-expectancy/no-reward conditions, were told that it was unclear how rewards affect motivation and interest; no expectancy was given about how long to expect someone to work on a task in a free-choice setting or how one would rate task interest. The precise information given is presented in Appendix A1.

After the participants had read the information they were asked to respond to a 5-item questionnaire (see Appendix A2). The first question asked participants what they thought the study was about. In the second question, participants were asked to rate on a scale of 1-7, whether a participant would spend very little (1) or very much time (7) on a task. Participants were also asked to state the exact number of minutes a person would spend on the task in the

third question. The last two questions were designed to assess the participant's own expectancies about rewards.

The results from the questionnaire indicated that respondents' answers to three of the items resulted in confirmation of the hypotheses (questions 1-3). For the first question, participants given the positive-expectancy information reported that the study was concerned with how rewards enhance motivation. For the negative-expectancy condition, students wrote that the study involved how rewards reduce motivation. Students given the no-expectancy information either wrote that the study was about rewards and motivation (generally) or they reported that they had no idea what the study was about.

For questions 2 and 3, the expected interaction effect was found (see Appendix A3). That is, participants who read the positive-expectancy information indicated that rewarded individuals would spend more time on the task and like the task more than non-rewarded individual; those in the negative-expectancy conditions reported the opposite, and scores for participants in the no-expectancy conditions fell in the middle. The last two questions appeared to be ambiguous. It was not clear whether respondents were answering based on their own view or based on what they had read (see results in Appendix A3).

After an examination of the questionnaire and the findings, the last two questionnaire items were adjusted to assess what participants' expectancies about giving money to work on a task according to what they had read. Two questions were added to assess participants' own expectancies about reward. After all revisions were made, the present study was conducted.

Participants

One hundred and eighty students (126 females and 54 males) from undergraduate introductory psychology classes at the University of Alberta volunteered and received course credit for participating in the study. All volunteers gave informed consent to participate.

Experimental sessions with one "experimenter" and one "participant" were run individually. One male and one female graduate student individually were in charge of the sessions.

Materials

The experiment took place in a laboratory with several rooms. The experimental room contained a video camera, two chairs, and a table. Items on the table included pencils, red markers, a current issue of Time and Newsweek, and the task.

The experimental task was a "find the difference" puzzle (see a sample in Appendix B). It consisted of two cartoon drawings, differing in six details. It originally appeared with the title Hocus Focus™ in local newspapers. This task has been used in previous studies on reward and intrinsic motivation (e.g., Eisenberger, Rhoades, & Cameron, 1999) and has been shown to be of interest to university students (Eisenberger & Leonard, 1980). The purpose of the task is to find differences between the two cartoon drawings.

The drawings were photocopied from a local newspaper, cut out and mounted on plain white paper, and then laminated. Forty-one pairs of cartoon drawings were prepared for the experimental sessions. Fifteen "find the

difference" problems were used for the treatment phase, twenty-five for the free-choice period, and one for demonstration purposes.

Other materials included the expectancy information (see Appendix A1), participant consent forms (see Appendix C), the scripts to be used by the "experimenters" (see Appendix D), and the script used by the graduate student researchers (see Appendix E).

Two "experimenter" questionnaires and one "participant" questionnaire were used in the study (Appendix F). Finally, two pages of debriefing information were constructed, one was reported orally to all the participants, and a written form was given to everyone who participated in the study (see Appendix G).

Procedure

The participants were assigned to pairs. One member of each pair was designated the "experimenter" in the study; the other became the research "participant". Each pair was then randomly assigned to one of six experimental conditions: (a) positive-expectancy/reward, (b) positive-expectancy/no-reward, (c) negative-expectancy/reward, (d) negative-expectancy/no-reward, (e) no-expectancy/reward, or (f) no-expectancy/no-reward.

In the positive-expectancy conditions, the students who played the role of "experimenters" were given information that rewards increase motivation. In the negative-expectancy conditions, the information indicated that rewards decrease motivation; and in the no-expectancy conditions, there was no expectation given about the effects of rewards on motivation. Those participants assigned the role of "participant" were either assigned to a reward or a no-reward condition. Thus, in each condition, there were 15 pairs of students (15 "experimenters" and 15

"participants"). Figure 3 shows the number of "experimenters" and participants" in each of the conditions.

Participants assigned the role of "experimenter" arrived at the session first (15 minutes before those who were assigned the role of "participant"). They were greeted by one of the researchers and escorted to the experimental room. The researcher introduced himself/herself, and told the participant that the study involved the role of experimenters in research concerned with human problem solving and behavior. These participants were told that they would be playing the role of an experimenter. As "experimenters", they would greet "participants", have them work on a problem-solving task, and then give them a free-choice opportunity. During the free-choice period, the "participants" could work on the experimental task or engage in an alternate activity. The "experimenters" were also told that in addition to their course credit, they would be paid $5.00.

The "experimenters" were then given one page of information, the expectancy for their condition. They were asked to read the information carefully. During this time, the researcher left the "experimenter" alone to read the information.

For "experimenters" in the positive-expectancy conditions, the information stated that rewards increase motivation by adding to a person's initial interest in an activity. "Experimenters" given the positive expectation, who were paired with no-reward "participants", read that they could expect that their "participants" would spend about 2 minutes during the 8-minute free-choice period working on the task. They were also told that their "participants" would report task liking as low. Those paired with rewarded "participants" read that they could expect that

their "participants" would spend about 6 minutes during the 8-minute free-choice period working on the task and that task interest would be rated as high.

For "experimenters" in the negative-expectancy condition, the information stated that rewards cause people to feel controlled leading to a reduction in interest and motivation. "Experimenters" given the negative-expectancy information who were paired with no-reward "participants" read that they could expect that their "participants" would spend about 6 minutes during the 8-minute free-choice period working on the task and that task liking would be high. Those paired with rewarded "participants" were told that they could expect their "participants" to spend about 2 minutes on the task during the free-choice period and task liking would be rated as low.

Finally, the information prepared for "experimenters" given no expectation about the effect of reward on motivation (paired with either reward or no-reward participants) did not state how long they should expect their "participants" to spend on the task during the free-choice period nor how "participants" would rate task interest.

Table 3.1 summarizes what the "experimenters" were told to expect in terms of the time a "participant" would spend on the task during the free-choice period and in terms of how the "participant" would rate task interest by expectancy condition.

After the "experimenters" had been given a few minutes to read the expectancies, they were given a script. The script specified what the "experimenters" would say and do as they ran a "participant" through the study. The "experimenters" were told they could keep the script with them while they

were conducting the study and that they could read from it. For five minutes the "experimenters" role-played what they were required to do.

Following the role-play, the volunteer assigned to the role of the "participant" arrived. The "participant" was greeted by the "experimenter" and escorted to the experimental room. The "experimenter" told the "participant" that the study concerned problem solving and behavior, and that the session would be videotaped. The "experimenter" first demonstrated how the "Find the Difference" task was to be done. The "participant" was then given 15 "Find the Difference" drawings and was asked to work on them for a few minutes. If the "participant" was assigned to a reward condition, he/she was offered $5.00 for doing the task and was told that it did not matter how many pictures he/she did or how many differences were found. "Participants" assigned to the no-reward condition were given the same instructions, but no offer of a reward was made.

The "experimenter" went to the adjoining room, leaving the "participant" alone to work on the task. After 5 minutes, the "experimenter" returned to the experimental room and gave $5.00 to the "participant" if he/she had been offered a reward to do the pictures. The "experimenter" then collected the pictures the "participant" had done, and said: "I'll need a few minutes before you do the next task. While I am gone, you can work on more pictures, read magazines, or do whatever you want, but please do not leave the room". The "experimenter" returned to the adjoining room. During this free-choice period, the "experimenter" completed a questionnaire — five items that assessed whether he/she remembered the expectancy information given to him/her, as well as two questions that assessed his/her own beliefs about the effects of reward.

After 8 minutes, the "experimenter" returned to the room and asked the "participant" to complete a questionnaire. The questions were designed to assess task interest, task difficulty, perceptions of competence, self-determination, anxiety, impressions of the "experimenter's" behavior, and any suspicions the "participant" had about the study. While the "participant" was completing the questionnaire, the "experimenter" returned to an adjacent room and completed a second questionnaire designed to assess the "experimenter's" perceptions of his/her own behavior as well as any suspicions he/she had formed about the study.

When both the "experimenter" and the "participant" had completed the questionnaires, the graduate researcher debriefed them together. All participants were told that the study was designed to investigate the effects of intrinsic versus extrinsic motivation on task performance and task interest. In addition, they were told that the researcher was interested in how an "experimenter's" expectations about how a "participant" would perform on a task would affect actual performance and task interest. Finally, the independent and dependent variables were described, each participant's role in the study was outlined, and the need for deception was explained. The "experimenter" and the "participant" (if assigned to the no-reward condition) were paid $5.00. All students were thanked for their participation and were asked not to mention anything that happened during the session to anyone. All participants received a written summary of the oral debriefing.

After the participants left, the graduate researcher recorded the performance measures from the treatment and free-choice periods.

Measures

Measures of the "Participants" Intrinsic Motivation

Free-time activity. The main behavioral measure of intrinsic motivation was indexed by the number of seconds in an 8-minute free-choice period (without reward) that "participants" appeared to be working on the task. The criterion chosen to establish whether or not a "participant" was working on the task during the free-choice period was that he/she was looking at or circling differences on the pictures. If a participant was reading or daydreaming and had a hand on a picture, he/she was judged not to be working on the task. This was the criterion used in Deci's (1971) study. The free-choice period was videotaped and a person unaware to the experimental conditions watched the tapes and recorded the time each participant spent on the task.

Task interest. A second measure of intrinsic motivation was based on "participants'" attitudes toward the task (Appendix F). Six items, on 7-point Likert rating scales, comprised the self-report attitude measure of intrinsic motivation. These items asked "participants" to report how interesting, enjoyable, exciting, pleasurable, tedious, and good they thought the task was. A rating of 7 indicated the highest degree of interest. Thus, the tedious item was reverse scored for the analysis.

Performance during the free-choice period. A third measure of intrinsic motivation was task performance during the free-choice period. Performance was indexed by the number of pictures a "participant" worked on during the free-choice session, the number of correct differences found, and the number of errors made.

Other measures of the "Participants"

Performance during the Experimental Period. Performance during the experimental phase was also indexed by the number of pictures a "participant" worked on during the free-choice session, the number of correct differences found, and the number of errors made.

Self-determination. Four items on 7-point Likert rating scales assessed "participants'" feelings of self-determination (Appendix F). The items assessed how free, constrained, controlled, and pressured "participants" felt during the experiment. A score of 7 indicated the greatest feelings of self-determination. Thus, the constrained, controlled, and pressured items were reverse scored for the analysis.

Competency. Three items on 7-point Likert rating scales evaluated "participants'" feelings of competency (Appendix F). The items asked to what degree "participants" felt competent, confident, and capable. A score of 7 indicated the greatest competency.

Task difficulty. "Participants" responded to four items on 7-point Likert rating scales that measured their attitudes about the difficulty of the task (Appendix F). The items asked how difficult, challenging, complex, and easy they felt the task was. A rating of 7 indicated the greatest degree of difficulty. Thus, the easy item was reverse scored for the analysis.

Anxiety. On 7-point Likert rating scales, "participants" reported on six items to indicate the degree of anxiety they felt (Appendix F). The items included nervous, intimidated, worried, distracted, calm, and comfortable. A rating of 7

indicated the highest degree of anxiety. Therefore, the calm and comfortable items were reverse scored for the analysis.

Task novelty. "Participants" responded to one item on a 7-point Likert rating scale (Appendix F) to indicate how novel they found the task. Two items measured how motivated and interested they felt during the experiment.

Self-report of motivation. On one 7-point Likert rating scale (Appendix F), "participants" reported how motivated they felt during the experiment.

Self-report of interest during the experiment. "Participants reported on one item measured on a 7-point scale how interested they felt during the study.

"Experimenters" own expectations. The last two items on the "experimenters'" first questionnaire were constructed to identify the "experimenters'" own expectations regarding rewards. One item asked what effect they thought money would have on the amount of time "participants" would work on a task. The second item asked what they thought the effect of money would be on "participants'" liking for a task. These items were answered immediately after the manipulation check items.

Measures of the Success of the Various Experimental Manipulations

Suspicion check of the "participants" and the "experimenters". Both "experimenters" and "participants" completed a 9-item questionnaire before the session debriefing (Appendix F). The items were open-ended questions designed to identify the "participants'" level of suspicion about the experimental hypotheses. The questions began as general statements about the study and became more specific towards the final questionnaire item. For example, the first item asked participants what they thought I was studying. The final question

stated that I was interested in how being rewarded or not rewarded affected the participants' perceptions of the task. Participants were asked if they had thought this, and if so, when.

Manipulation check of the "experimenters". The first questionnaire that was given to "experimenters" when "participants" were in the treatment phase was made up of 7 items (Appendix F). Five items were designed to assess the expectancy manipulation.

Of the 5 items designed to assess the expectancy manipulation, two of the items, based on the written expectancy information, assessed how much time "experimenters" thought "participants" would spend on the task during the free-choice period and how much "participants" would like the task. Two other items, based on what "experimenters" had read, assessed what effect "experimenters" thought money would have on the amount of time "participants" would spend on the task and how much they would like it. One item, an open-ended question assessing what "experimenters" thought the study was about, was ambiguous and was excluded from the analysis.

"Experimenter behavior". The second questionnaire completed by "experimenters" consisted of 13 items, each on a 7-point Likert scale designed to assess the "experimenters'" perceptions of their own behavior. "Participants" responded to the same questionnaire to assess their perceptions of the "experimenters'" behavior. The items asked to what degree the experimenter used body gestures, made eye-contact, smiled, etc. (Appendix F).

Data Analysis

In order to assess task interest, self-determination, competence, task difficulty, and "participant" anxiety, items that were considered to measure the same construct were analyzed with MANOVA. Table 3.3 shows the items that provided a measure of each construct. For example, the task interest construct was comprised of 6 items indicative of how participants felt about the task. These items were enjoyable, pleasurable, good, exciting, tedious, and interesting.

	No-reward	Reward
Positive expectancy	$\underline{n}_e = 15$ $\underline{n}_p = 15$	$\underline{n}_e = 15$ $\underline{n}_p = 15$
No expectancy	$\underline{n}_e = 15$ $\underline{n}_p = 15$	$\underline{n}_e = 15$ $\underline{n}_p = 15$
Negative expectancy	$\underline{n}_e = 15$ $\underline{n}_p = 15$	$\underline{n}_e = 15$ $\underline{n}_p = 15$

Figure 3. Summary of the factorial design showing the number of "Participants" and "Experimenters" in each condition. Subscripts e and p refer to "experimenters" and "participants" respectively.

Table 3.1

Expectancies Created for "Experimenters" by Condition

Condition	Expectancy	
	Time on task (in minutes)	Attitude rating (7 point Likert)
Positive-expectancy		
No-reward	Two	Low
Reward	Six	High
No-expectancy		
No-reward	No value	No rating
Reward	No value	No rating
Negative-expectancy		
No-reward	Six	High
Reward	Two	Low

Table 3.2

Items Measured Indicative of Each Construct

Interest	Self-Determination	Competence	Difficulty	Anxiety
Enjoyable	Free	Capable	Challenging	Nervous
Pleasurable	Controlled	Competent	Complex	Comfortable
Interesting	Constrained	Confident	Difficult	Worried
Exciting	Pressured		Easy	Calm
Good				Intimidated
Tedious				Distracted

CHAPTER 4

RESULTS

In this chapter, the results from the current study are presented. The chapter begins with the outcomes of the suspicion and manipulation checks, and the checks on "experimenters'" own expectancies. Next, the results of the effects of reward and experimenter expectancy on dependent measures of intrinsic motivation (free-time behavior, task interest and performance on the task during the free-choice period) are reported. This is followed by an analysis of performance on the task during the treatment session. Results from the questionnaire measures are presented next, followed by an analysis of "experimenters" actual beliefs about reward and their effects on the free time and task interest measures of intrinsic motivation. Finally, the analysis of the "experimenters'" behavior is described.

Suspicion Check of the "Participants" and "Experimenters"

The "experimenters" and "participants" completed a 9-item questionnaire at the end of the session. The first item, an open-ended question, was intended to determine if the "experimenters" and/or the "participants" were aware that the study was about the role of experimenters' expectations and how those expectancies shape the behavior of participants. Of the 90 "experimenters", 87 (97%) were unaware of the nature of the study. Three "experimenters" (3%), thought the study involved how experimenters' attitudes affect participants behavior. Of the 90 "participants", 89 (99%) were unaware of the study's purpose. One participant (1%) thought the study was concerned with how an

experimenter's attitude affects performance. Overall, the "experimenters" and the "participants" were unaware of the precise purpose of the study. Therefore, no data were excluded from the statistical analysis.

The next two items on the "experimenters'" questionnaire asked "experimenters" whether there was anything that could have affected their performance and/or perceptions of the task, and whether they could have done anything that could have affected the responses of the "participants". Two similar items appeared on the "participants'" questionnaire. "Participants" were asked if there was anything that could have affected their performance and/or perceptions of the task, and whether the "experimenters" could have done anything to affect their responses. Responses for these items from both "experimenters'" and "participants'" questionnaires included such things as: fatigue, hunger, concentration, being told they would be evaluated, being told there was a time limit for working on the task, nervousness, etc. These items were intended to have "experimenters" and "participants" generate some of the things that may have affected responses during the study, and was a lead into the following four items on the questionnaires for the "experimenters'" and the "participants'".

For the "experimenters", the next four items asked if "experimenters" had (a) done anything that suggested to the "participants" that they would perform well or poorly at the task, (b) suggested to the "participants" if they would like or dislike the task, (c) given the "participants" anything that could have affected their task performance, or (d) said anything that would have affected the "participants'"

task performance or perceptions of the task. Other than "experimenters" who were paired with rewarded "participants" reporting that they had given them money, no "experimenters" reported that they had done any of the items mentioned above. This suggests that "experimenters" felt that they did not intentionally do anything to alter the behavior of the "participants".

"Participants" responded to four items that were similar to the items on the "experimenters'" questionnaire. "Participants" were asked if the "experimenters" had (a) done anything that suggested they should perform well or poorly at the task, (b) suggested if they would like or dislike the task, (c) given them anything that could have affected their task performance, or (d) said anything that would have affected their performance and/or perception of the task. Other than rewarded "participants" who reported that "experimenters" had offered them money, which could have affected their performance and interest in the task, "participants" generally responded that the "experimenters" neither did anything nor said anything to alter their behavior during the study. In other words, the "participants" reported that "experimenters" did not intentionally try to alter the "participants" task interest.

The final two items on both the "experimenters'" and the "participants'" questionnaires stated that the study was concerned with how instructions given to "experimenters" affected the "participants" behavior, and how rewarding or not rewarding "participants" impacted their perceptions of the task. No "experimenters" or "participants" reported that they thought the study was concerned with how instructions to experimenters affected participants' behavior.

In terms of the final question, only "experimenters" paired with rewarded "participants" and those "participants" who received a reward for doing the task thought the study was about reward and task perceptions.

Generally, "experimenters" and "participants" were not aware of the true nature of the study. In addition, the "experimenters" reported that they had done nothing intentionally to shape the "participants'" responses and the "participants" reported the same.

Manipulation Checks of the "Experimenters"

After giving "participants" a free-choice period, "experimenters" completed a questionnaire. The questionnaire was made up of five items that assessed the expectancy manipulation and two items that identified the "experimenters'" own expectations regarding rewards. The first item, the open-ended question, was omitted from analysis due to the ambiguous wording of the question.

The purpose of the second question was to assess how much time "experimenters" expected their "participants" to spend on the task, based on the expectancy information they were given. "Experimenters" were asked to rate on a scale of 1-7 whether a "participant" would spend very little (1) or very much time (7) on the task. The univariate analysis of variance (ANOVA) resulted in no main effect of expectancy, $F(2, 84) = 2.37$, $p > .05$ a main effect of reward, $F(1, 84) = 24.935$, $p < .0005$, and a significant interaction of expectancy by reward condition, $F(2, 84) = 10.65$, $p < .0005$ (see figure 4.1). Figure 4.1 shows that "experimenters" given a positive expectation and no expectation reported that no-reward "participants" would spend less time on the task ($M = 2.47$, $SD = 1.64$ and

M = 3.73, SD = 1.71, respectively) than rewarded "participants" (M = 5.87, SD = 1.13 and M = 5.47, SD = 1.25, respectively). In contrast, "experimenters" given a negative expectation reported that non-rewarded "participants" would spend more time on the task (M = 3.87, SD = 1.92) then rewarded "participants" (M = 3.60, SD = 1.45). These results demonstrate that the expectancy manipulation was somewhat successful for the positive expectancy group but not as successful for the negative expectancy group.

In a second manipulation check, "experimenters" were asked to state the exact number of minutes they expected their "participants" to spend on the task. Again, the results of the ANOVA supported the hypothesized interaction, F(2, 84) = 6.89, p = .002 (see figure 4.2). There was no main effect of expectancy, F(2, 84) = 1.32, p > .05 and no main effect of reward, F(1, 84) = 1.74, p > .05. Figure 4.2 depicts that "experimenters" given the positive expectancy indicated that rewarded "participants" would spend about 6 minutes on the task (M = 5.73, SD = 1.53) and non-rewarded "participants" would spend about 2.5 minutes on the task (M = 2.67, SD = 2.26). "Experimenters" given the negative expectancy information wrote that non-rewarded individuals would spend about 4 minutes on the task (M = 3.93, SD = 2.77) and rewarded individuals would spend less than 3 minutes (M = 2.80, SD = 1.42). "Experimenters" given no expectation indicated that both rewarded and non-rewarded "participants" would spend about 3.5 minutes on the task (M = 3.37, SD = 2.07 and M = 3.40, SD = 3.09, respectively) during the free-choice period. Although the interaction of expectancy by reward was significant, the average minutes reported were not exactly the numbers

supplied from the expectancy information. These findings suggest that the induced expectancy was successful for the positive expectancy group but not as successful for the negative expectancy group.

Another question assessed what effect "experimenters" thought money would have on the amount of time a "participant" would spend on the task, based on the expectancy information provided to the "experimenters". "Experimenters" were asked to indicate if "participants" would spend very little (1) or very much (7) time on the task after receiving money for doing it. To assess what effect giving a reward to "participants" would have on their free-choice behavior, I collapsed across reward groups and conducted a one-way ANOVA on the effects of the expectancy condition only. The results of the one-way ANOVA indicated no effect of expectancy, $F(2, 87) = 2.08$, $p > .05$. However, the mean ratings by "experimenters" were in the predicted direction. The positive expectancy group's mean rating was higher ($M = 5.63$, $SD = 1.56$) than the negative expectancy group ($M = 5.07$, $SD = 1.93$). The mean for the no expectancy group was the lowest ($M = 4.67$, $SD = 2.01$). Although the test of the difference between means was not significant, the direction of the mean scores provides some support (although weak) that the manipulation was successful.

On a scale of 1-7, "experimenters" were asked based on what they read, after giving "participants" money for doing the task, if "participants" would dislike (1) or like (7) the task. To assess what effect giving a reward to "participants" would have on their liking for the task, I collapsed across reward conditions and conducted a one-way ANOVA on the effects of the expectancy condition only.

The results of the one-way ANOVA indicated a significant effect of expectancy, $F(2, 87) = 4.31$, $p = .016$. The data failed the Levene's test of homogeneity of variance. Therefore, Dunnett's T3 post-hoc test was conducted as it does not assume homogeneity of the groups. The Dunnett T3 post-hoc test revealed a significant difference between the positive expectancy and negative expectancy conditions, $p = .030$. "Experimenters" given a positive expectation about reward reported that money would cause high liking for a task ($M = 5.90$, $SD = 1.03$). "Experimenters" given a negative expectation reported that money would cause lower liking for a task ($M = 4.90$, $SD = 1.77$). The mean for the no expectancy condition fell in the middle ($M = 5.63$, $SD = 1.19$). There was no significant difference between the positive expectancy and no expectancy conditions, or between the no expectancy and negative expectancy conditions for the effects of reward on "participants'" liking of the task. This finding suggests that the manipulation was only marginally successful.

In summary, the manipulation check items provide some support that the expectancy manipulation was successful for the positive expectancy conditions. However, for the negative expectancy group, the manipulation was not strong. All in all, these data suggest that the manipulation was not strong.

The Effects of Reward and Experimenter Expectancy

Effects on Measures of Intrinsic Motivation

Free-time activity. The free-time behavioral measure of intrinsic motivation was indexed by the number of seconds in an 8-minute period that "participants" worked on the task. The ANOVA revealed no main effect of experimenter

expectancy, $F(5, 84) = .77$, $p > .05$, no main effect of reward, $F(1, 84) = .73$, $p > .05$, and no interaction effect, $F(2, 84) = .11$, $p > .05$.

The means and standard deviations for the free-time measure are presented in Table 4.1. For all expectancy conditions, the rewarded "participants" spent longer on the task (M = 142.9 s, SD = 202.5 s) than "participants" who did not receive a reward (M = 107.2 s, SD= 192.2 s).

Self-reported task interest. A multivariate analysis of variance (MANOVA) was conducted to determine the effects of experimenter expectancy and reward on self-reported measures of task interest. The multivariate F ratios were generated from Pillai's Trace Criterion. Results from the MANOVA indicated no main effect of expectancy, $F(12, 158) = 1.56$, $p > .05$, no main effect of reward, $F(6, 78) = 1.16$, $p > .05$, but a significant interaction effect of expectancy by reward, $F(12, 158) = 2.45$, $p = .006$. Univariate tests confirmed the presence of significant group differences for the "exciting" and "tedious" items: exciting, $F(2, 83) = 4.17$, $p = .019$; tedious, $F(2, 83) = 4.36$, $p = .016$. There were no significant differences on the interesting item, $F(2, 83) = .35$, $p > .05$; the enjoyable item, $F(2, 83) = .49$, $p > .05$; the pleasurable item, $F(2, 83) = 1.84$, $p > .05$; or the good item, $F(2, 83) = .26$, $p > .05$.

Figure 4.4 depicts the results of the interaction. Figure 4.4 indicates that rewarded "participants" run by "experimenters" given a positive expectation about the effect of reward on intrinsic motivation reported they found the task significantly less interesting compared to individuals who did not receive a reward. In contrast, rewarded "participants" run by "experimenters" given a

negative expectation about reward reported greater feelings of task interest compared to non-rewarded "participants".

The means and standard deviation scores for the 6 self-report interest items appear in Table 4.2. On average, for all six items, no reward "participants" in the positive expectancy condition reported higher mean scores (M = 5.08, SD = 1.03) compared to rewarded "participants" (M = 4.21, SD = 1.31). In the negative expectancy condition, rewarded "participants" reported higher mean interest ratings (M = 4.35, SD = 1.60) compared to no reward individuals (M = 3.58, SD = 1.79). Ratings for rewarded and no reward "participants" in the no-expectancy condition were similar (M = 4.49, SD = 1.40 and M = 4.46, SD = 1.32, respectively).

Performance during the free-choice period. Unfortunately, the performance measure for the free-choice period could not be analyzed. This was because not all "participants" who worked on the task during the free-choice period circled differences.

Other Measures of the "Participants"

Task performance during the experimental phase. The number of pictures attempted, the number of differences found correctly and the number of errors made indexed task performance. The treatment phase performance measures were analyzed with MANOVA. All multivariate F's were generated using Pillai's Trace criterion. There was no main effect for experimenter expectancy, F (6, 166) = .99, p > .05, no main effect for reward, F (3, 82) = .90, p > .05, and no interaction effect, F (6, 166) = .32, p > .05.

Table 4.3 presents the mean scores and standard deviations by condition. The mean scores for the number of pictures attempted and the number of differences correctly identified were in the predicted direction. For the positive expectancy condition, Table 4.3 shows that rewarded individuals attempted more pictures (M = 6.7, SD = 2.4) and found more differences correctly (M = 31.5, SD = 9.3) than the no reward group (M = 6.5, SD = 1.6 and M = 31.3, SD = 8.5). However, the positive expectancy reward group made more errors (M = 0.5, SD = 0.9) compared to the no reward group (M = 0.3, SD = 0.6). "Participants" in the no expectancy condition showed performance measures in the opposite direction as the "participants" in the positive expectancy condition. No reward "participants" attempted more pictures (M = 7.4, SD = 2.5), made more correct responses (M = 33.7, SD = 9.9) and made fewer errors (M = 0.3, SD = 0.6) than rewarded participants (M = 6.9, SD = 1.8, M = 31.3, SD = 6.8, and M = 0.7, SD = 1.1, respectively). In the negative expectancy condition, no reward "participants" also attempted more pictures (M = 6.8, SD = 3.0), made more correct responses (M = 29.5, SD = 10.0), and made fewer errors (M = 0.2, SD = 0.4) than rewarded individuals (M = 6.4, SD = 2.4, M = 29.1, SD = 10.8, and M = 0.3, SD = 0.7, respectively).

Self-determination. A MANOVA was performed using 4 items indicative of self-determination. All F ratios were generated using Pillai's Trace Criterion. The results of the MANOVA indicated no main effect of expectancy, $F(8, 158) = .37$, $p > .05$, a main effect of reward, $F(4, 78) = 2.71$, $p = .036$, and no interaction of expectancy by reward, $F(8, 158) = .74$, $p > .05$. Univariate tests confirmed the

presence of significant group differences for the controlled item: controlled, $F(1, 81) = 5.69$, $p = .02$; free, $F(1, 81) = .66$, $p > .05$; constrained, $F(1, 81) = .11$, $p > .05$; and a marginal effect for the pressured item, $F(1, 81) = 3.00$, $p = .087$.

Table 4.4 presents the means and standard deviations for the self-determination items. Across expectancy conditions, rewarded "participants" reported feeling less self-determined ($M = 4.91$, $SD = 1.63$) than non-rewarded participants ($M = 5.01$, $SD = 1.40$).

Competency. A MANOVA was conducted using 3 self-report items indicating competency. All F ratios were generated using Pillai's Trace Criterion. The results of the MANOVA revealed no main effect of expectancy, $F(6, 160) = .29$, $p > .05$, no main effect of reward, $F(3, 79) = .90$, $p > .05$, and no interaction effect, $F(6, 160) = 1.79$, $p > .05$.

The means and standard deviations of these items are presented in Table 4.5. On average, non-rewarded "participants" in the positive expectancy condition reported feeling more competent ($M = 5.38$, $SD = 0.86$) than rewarded "participants" ($M = 4.98$, $SD = 1.0$). Rewarded individuals in the negative expectancy condition reported feeling more competent ($M = 5.45$, $SD = 1.18$) than non-rewarded individuals ($M = 4.88$, $SD = 1.44$). Similarly, rewarded "participants" in the no expectancy condition reported feeling more competent ($M = 5.44$, $SD = 1.14$) relative to non-rewarded "participants" ($M = 5.38$, $SD = 0.81$).

Task difficulty. A MANOVA was conducted to determine whether there was an experimenter expectancy effect or a reward effect on the four items measuring task difficulty. The Multivariate F ratios were generated with Pillai's

Trace Criterion. The MANOVA indicated no main effect of experimenter expectancy, $F(8, 162) = .31$, $p > .05$, no main effect of reward, $F(4,80) = 1.79$, $p > .05$, and no interaction effect, $F(8, 162) = .38$, $p > .05$.

The means and standard deviations of the task difficulty items appear in table 4.6. Across all expectancy conditions, on average, rewarded "participants" found the task less difficult ($M = 2.34$, $SD = 1.11$) compared to non-rewarded individuals ($M = 2.60$, $SD = 1.36$).

"Participant" anxiety. A MANOVA was conducted using six anxiety indicators. All F ratios were generated using Pillai's Trace Criterion. The MANOVA indicated no main effect of expectancy, $F(12, 154) = .76$, $p > .05$, no main effect of reward, $F(6, 76) = .95$, $p > .05$, and no interaction effect, $F(12, 154) = .50$, $p > .05$.

The means and standard deviations are presented in Table 4.7. Across all expectancy conditions, rewarded individuals reported feeling less anxiety ($M = 2.32$, $SD = 1.18$) than non-rewarded individuals ($M = 2.58$, $SD = 1.36$).

Task novelty. One item intended to measure novelty of the experimental task was analyzed individually with ANOVA. The results of the ANOVA indicated no main effect of expectancy, $F(2, 82) = 1.38$, $p > .05$, no main effect of reward, $F(1, 82) = .20$, $p > .05$, and no interaction effect, $F(2, 82) = .40$, $p > .05$. As can be seen from Table 4.8, all "participants", on average, reported task novelty ratings higher than the median score on the 7-point Likert rating scale.

Self-report of motivation. One item on the "participants'" questionnaire assessed how motivated "participants" felt after the free-choice period and was analyzed using ANOVA. The ANOVA revealed no main effect of expectancy, $F(2, 81) = .07$, $p > .05$, no main effect of reward, $F(1, 81) = .21$, $p > .05$, and no interaction effect, $F(2, 81) = .76$, $p > .05$.

Self-report of interest during the experiment. One item on the "participants'" questionnaire assessed how interested "participants" felt after the free-choice period and was analyzed using ANOVA. The ANOVA revealed no main effect of expectancy, $F(2, 82) = .25$, $p > .05$, no main effect of reward, $F(1, 82) = .64$, $p > .05$, and no interaction effect, $F(2, 82) = .37$, $p > .05$. The means and standard deviations of these items are presented in Table 4.8. In the positive expectancy condition, non-rewarded individuals reported feeling more motivated ($M = 4.36$, $SD = 1.39$) and interested ($M = 5.21$, $SD = 0.97$) relative to rewarded "participants" ($M = 4.07$, $SD = 1.33$ and $M = 4.60$, $SD = 1.30$, respectively). The results for the negative expectancy condition are the opposite. Rewarded individuals reported greater feelings of motivation ($M = 4.57$, $SD = 2.10$) and interest ($M = 4.79$, $SD = 2.01$) compared to non-rewarded "participants" ($M = 3.80$, $SD = 1.90$ and $M = 4.73$, $SD = 1.83$).

The Effects of "Experimenters'" Own Expectations and Reward on Dependent Measures of Intrinsic Motivation

Check on "Experimenters'" Own Expectations

Two questions assessed the "experimenters'" own expectancies about rewards as opposed to the information provided to them about the effects of

reward on motivation. The first question asked whether they thought giving "participants" money for doing a task would cause them to spend very little (1) or very much (7) time on the task. The ANOVA resulted in no main effect of expectancy, $F(2, 84) = .04$, $p > .05$, a main effect of reward, $F(1, 84) = 27.880$, $p < .005$, but no interaction effect, $F(2, 84) = .23$, $p > .05$. Based on their own view, "experimenters" thought that giving "participants" money for doing a task would cause them to spend less time on the task ($M = 4.13$, $SD = 1.62$) compared to non-rewarded "participants" ($M = 5.76$, $SD = 1.21$). In other words, regardless of the expectancy information they were given, the data show that these students believed that rewards would negatively affect people's motivation.

The second question asked "experimenters" whether they thought giving money to "participants" for doing a task would cause them to dislike (1) or like (7) the task. The ANOVA indicated no main effect of expectancy, $F(2, 84) = 2.24$, $p > .05$, no main effect of reward, $F(1, 84) = .24$, $p > .05$, but a significant interaction effect, $F(2, 84) = 3.25$, $p = .044$. This interaction effect is depicted in Figure 4.3. Across all expectancy conditions (positive expectancy, no expectancy, and negative expectancy), Figure 4.3 shows that "experimenters" running no reward "participants", reported no significant difference in the amount of liking they reported money would produce ($M = 5.33$, $SD = 1.05$, $M = 5.33$, $SD = 1.35$, and $M = 5.47$, $SD = 1.25$, respectively). In contrast, for rewarded "participants", "experimenters" given a positive expectation reported that their "participants" would report greater task liking ($M = 5.40$, $SD = 1.30$) than "experimenters" given

a negative expectation (M = 4.40, SD = 1.40); the mean of the no expectancy group was the greatest (M = 5.93, SD = 1.39).

To assess the effect of "experimenters'" actual expectation about the effect of reward on "participants'" intrinsic motivation, "experimenters" were classified into one of three groups depending on responses to their own views about the effect of reward. Recall that "experimenters" were asked whether they thought giving "participants" money for doing a task would cause them to spend very little (1) or very much (7) time on the task. "Experimenter" ratings of 1-3 were classified as low, a rating of 4 was classified as moderate, and ratings of 5-7 were classified as high. Similarly, "experimenters" were asked if money would cause "participants" to report low task interest (1) or high task interest (7). Again, "Experimenter" ratings of 1-3 were classified as low, a rating of 4 was classified as moderate, and ratings of 5-7 were classified as high.

Free-time Activity

An ANOVA was performed to determine if there was an effect of "experimenters'" own views on the free-time dependent measure of intrinsic motivation. The results indicated no main effect of actual expectancy, $F(2, 85) = 1.61$, $p > .05$, no main effect of reward, $F(1, 85) = .03$, $p > .05$, and no interaction effect, $F(1, 85) = .04$, $p > .05$.

Task Interest

A MANOVA was performed to determine if there was an effect of "experimenters'" own views on the self-report measure of intrinsic motivation. The results indicated no main effect of actual expectancy, $F(12, 158) = 1.00$, $p >$

.05, no main effect of reward, $F(6, 78) = 1.42$, $p > .05$, and no interaction effect, $F(12, 158) = .43$, $p > .05$.

Experimenter Behavior

At the conclusion of the experiment, each "participant" was asked to fill out a questionnaire describing the behavior of his/her "experimenter" during the course of the experiment. "Experimenters" completed the same forms describing their own behavior during the experiment. These forms consisted of 13 seven-point rating scales ranging from 1 (not very much) to 7 (a great deal). Table 4.9 shows the mean ratings of the "experimenters" by their "participants" and by themselves. The profiles of the "experimenters" as they were viewed by their "participants" showed remarkable similarity to the profile of the "experimenters" as viewed by themselves.

Using the "participants'" ratings of "experimenters" behaviors, two scales were created. One scale was comprised of positive nonverbal behaviors and the second scale was comprised of negative nonverbal behaviors.

ANOVAs were conducted on the positive and negative non-verbal behavior scales. The ANOVA for the positive nonverbal behavior scale indicated no main effect of expectancy, $F(2, 82) = .43$, $p > .05$, no main effect of reward, $F(1, 82) = .08$, $p > .05$, and no interaction effect $F(2, 82) = .80$, $p > .05$.

The ANOVA for the negative nonverbal behavior scale indicated no main effect of expectancy, $F(2, 83) = .60$, $p > .05$, no main effect of reward, $F(1, 83) = .12$, $p > .05$, but a significant interaction effect of expectancy by reward, $F(2, 83) = 4.31$, $p = .017$. In the positive expectancy condition, rewarded "participants"

reported that their "experimenters" produced more negative non-verbal behaviors (M = 2.17, SD = 1.10) relative to the non-rewarded "participants" (M = 1.46, SD = 1.08). In both the no expectancy and negative expectancy conditions, non-rewarded "participants" expressed that their "experimenters" made more negative non-verbal behaviors (M = 2.13, SD = 1.06 and M = 1.70, SD = 0.86, respectively) than rewarded "participants" reported about their "experimenters" (M = 1.46, SD = 0.51 and M = 1.47, SD = 0.72, respectively).

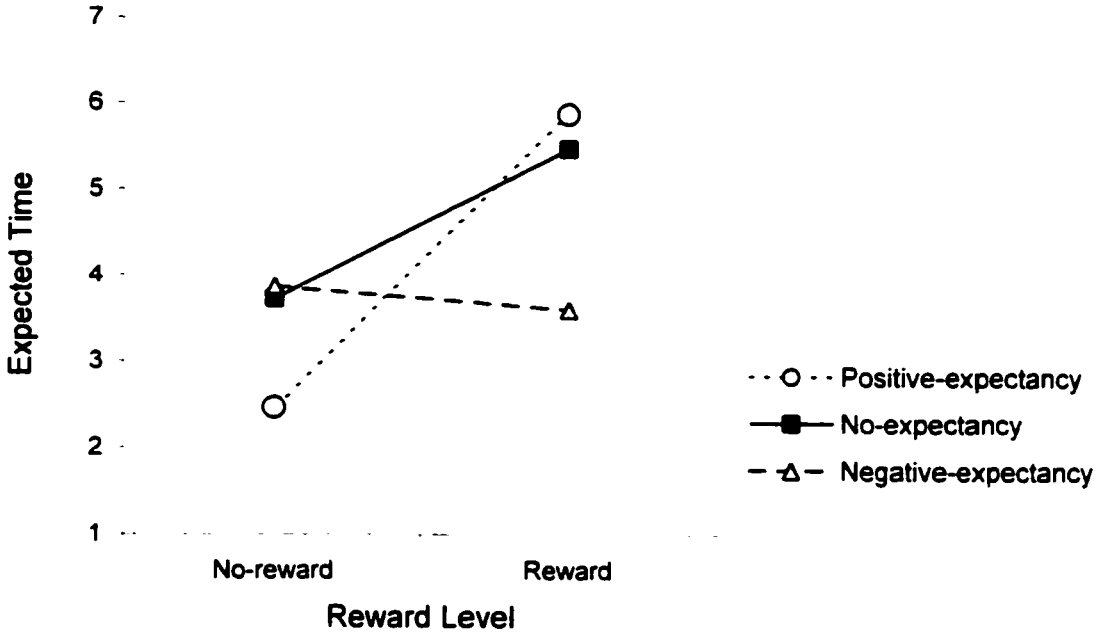

Figure 4.1. "Experimenters'" expectations, based on the expectancy information given to them, of how little or how much time "participants" would spend on the task during the free-choice period. A score of seven indicates the longest amount of time.

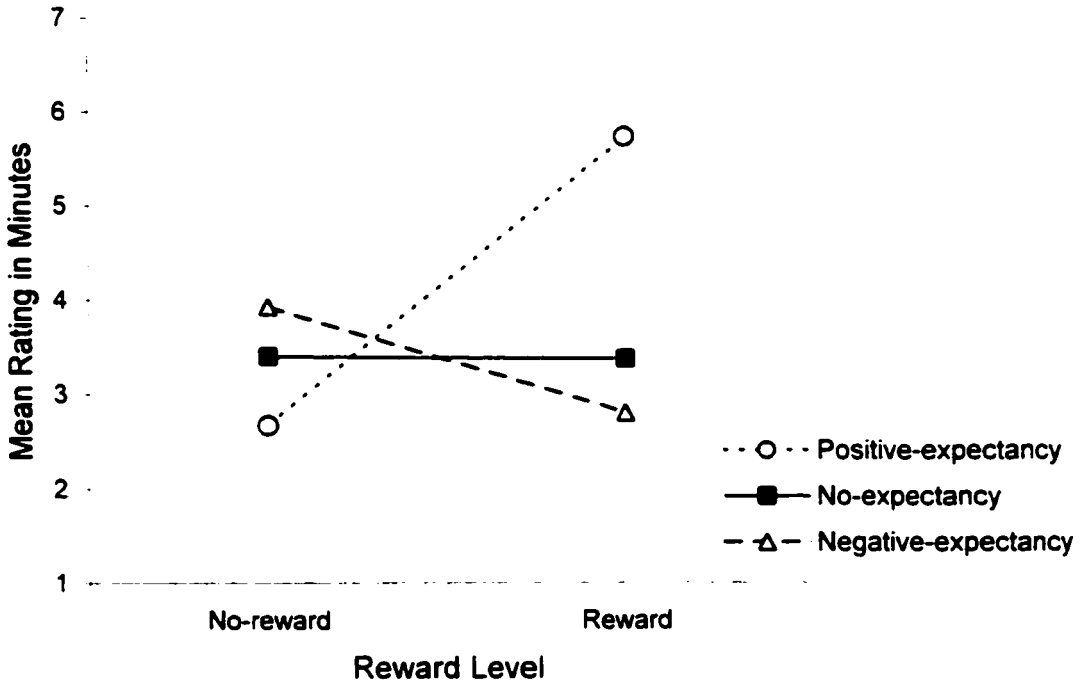

Figure 4.2. Exact number of minutes, based on what "experimenters" read, that "experimenters'" expected "participants" to work on the task during the free-choice period.

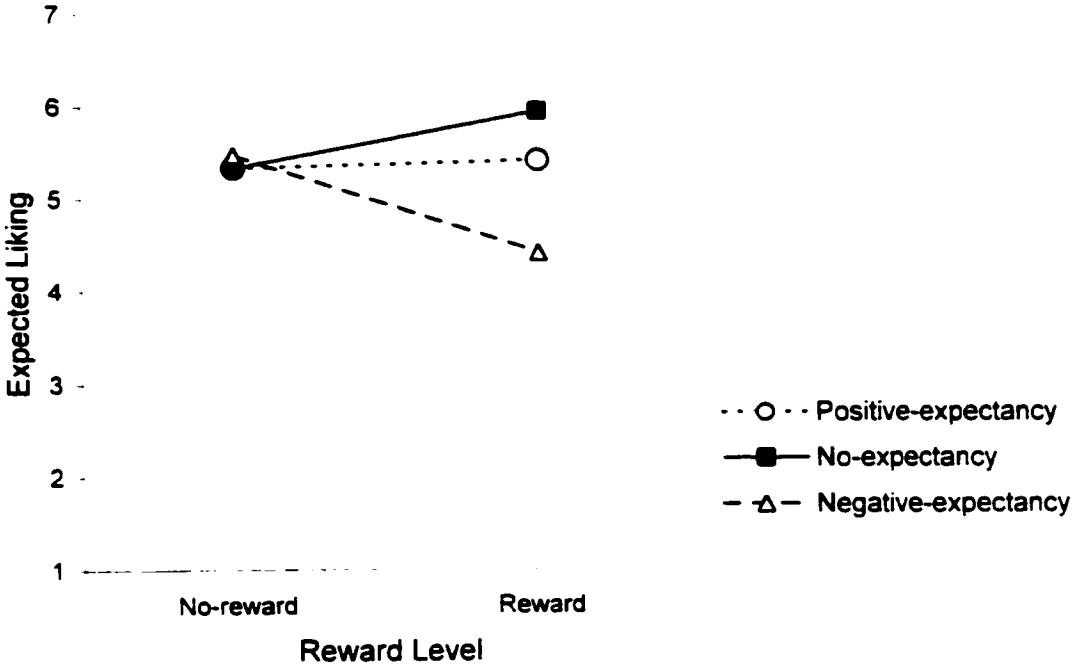

Figure 4.3 "Experimenters'" own view on the effect of money on "participants'" liking of the task. A rating of seven indicates the highest degree of liking.

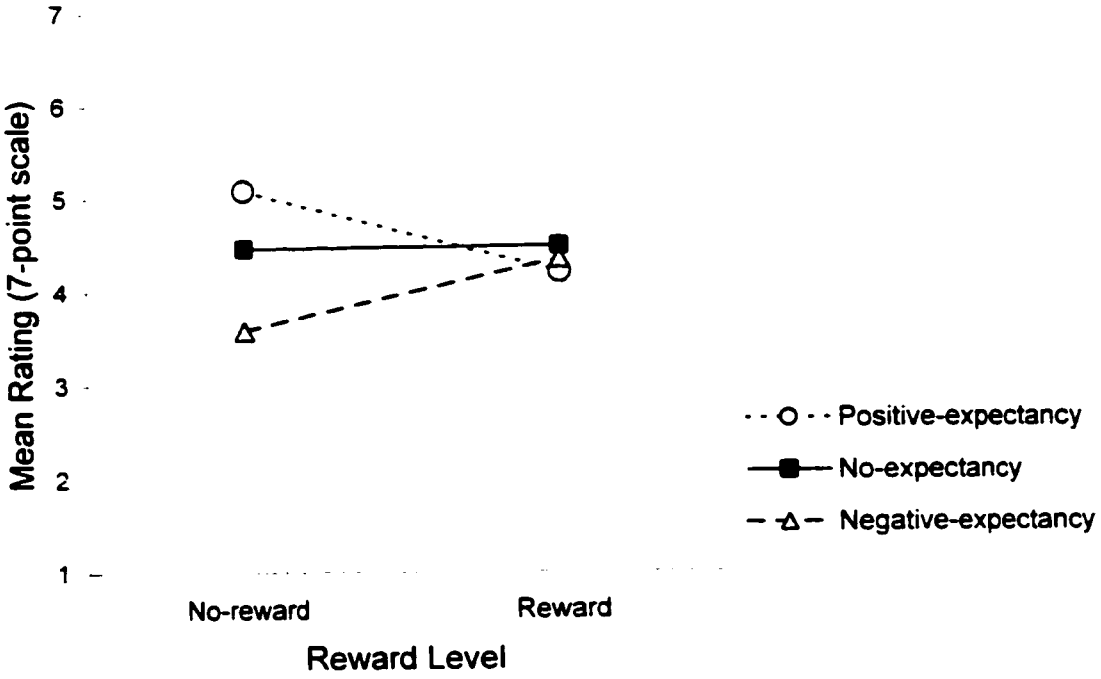

Figure 4.4. Interaction effect of expectancy by reward on "particpants'" task interest.

Table 4.1

Amount of Free Time Spent on the Task by Expectancy and Reward Conditions

	Time (s)	
Condition	M	SD
Positive expectancy		
No reward	132.7	(207.4)
Reward	148.1	(217.3)
No expectancy		
No reward	73.5	(168.7)
Reward	103.7	(178.7)
Negative expectancy		
No reward	115.3	(200.4)
Reward	176.9	(211.4)

Table 4.2

Task Interest Measures by Expectancy and Reward Conditions

	Exciting		Tedious		Interesting		Enjoyable		Pleasurable		Good		Mean	
Condition	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Positive expectancy														
No reward	4.50	(1.16)	5.71	(1.20)	4.86	(1.17)	5.14	(0.77)	5.14	(0.95)	5.14	(0.95)	5.08	(1.03)
Reward	2.87	(1.36)	4.07	(2.02)	4.40	(1.50)	4.67	(1.11)	4.33	(0.98)	4.93	(0.88)	4.21	(1.31)
No expectancy														
No reward	3.60	(1.64)	4.53	(1.41)	4.40	(1.18)	4.87	(1.30)	4.47	(1.30)	4.87	(1.06)	4.46	(1.32)
Reward	3.67	(1.59)	4.60	(1.76)	4.53	(1.36)	5.07	(1.28)	4.87	(1.06)	4.20	(1.37)	4.49	(1.40)
Negative expectancy														
No reward	3.47	(1.81)	4.53	(1.88)	4.27	(1.94)	4.67	(1.80)	4.27	(1.75)	4.27	(1.53)	3.58	(1.79)
Reward	4.01	(1.62)	5.10	(1.55)	4.33	(1.54)	4.73	(1.71)	4.60	(1.80)	3.87	(1.36)	4.35	(1.60)

Note. High values indicate the greatest degree of interest.

Table 4.3

Performance During the Experimental Phase by Expectancy and Reward Conditions

	Performance					
	Attempted		Correct		Errors	
Condition	M	SD	M	SD	M	SD
Positive expectancy						
No reward	6.5	(1.60)	31.3	(8.5)	0.3	(0.6)
Reward	6.7	(2.4)	31.5	(9.3)	0.5	(0.9)
No expectancy						
No reward	7.4	(2.5)	33.7	(9.9)	0.3	(0.6)
Reward	6.9	(1.8)	31.3	(6.8)	0.7	(1.1)
Negative expectancy						
No reward	6.8	(3.0)	29.5	(10.0)	0.2	(0.4)
Reward	6.4	(2.4)	29.1	(10.8)	0.3	(0.7)

Table 4.4

Self-determination Measures by Expectancy and Reward Conditions

	Free		Controlled		Constrained		Pressured		Meanl	
Condition	M	SD	M	SD	M	SD	M	SD	M	SD
Positive expectancy										
No reward	3.93	(0.92)	5.64	(1.39)	5.57	(1.45)	5.71	(1.44)	5.21	(1.30)
Reward	3.86	(1.41)	4.57	(2.07)	5.93	(1.27)	5.43	(1.87)	4.95	(1.66)
No expectancy										
No reward	3.93	(0.80)	5.13	(1.46)	5.27	(1.39)	4.67	(1.29)	4.75	(1.24)
Reward	4.00	(1.46)	4.80	(1.97)	5.80	(1.37)	4.47	(1.25)	4.77	(1.51)
Negative expectancy										
No reward	4.20	(1.86)	5.73	(1.39)	5.80	(1.52)	4.53	(1.92)	5.07	(1.67)
Reward	3.79	(1.93)	4.50	(1.91)	6.00	(1.18)	5.79	(1.93)	5.02	(1.74)

Note. High scores indicate the greatest feelings of self-determination

Table 4.5

Competency Measures by Expectancy and Reward Conditions

	Competent		Capable		Confident		Mean	
Condition	M	SD	M	SD	M	SD	M	SD
Positive expectancy								
No reward	5.36	(0.84)	5.71	(0.91)	5.07	(0.83)	5.38	(0.86)
Reward	4.80	(1.15)	5.07	(0.70)	5.08	(1.16)	4.98	(1.00)
No expectancy								
No reward	5.40	(0.83)	5.67	(0.72)	5.07	(0.88)	5.38	(0.81)
Reward	5.13	(1.30)	5.67	(0.98)	5.53	(1.13)	5.44	(1.14)
Negative expectancy								
No reward	4.50	(1.65)	5.21	(1.19)	4.93	(1.49)	4.88	(1.44)
Reward	5.50	(1.22)	5.64	(1.08)	5.21	(1.25)	5.45	(1.18)

Note. High scores indicate the greatest feelings of competency.

Table 4.6

Task Difficulty Measures by Expectancy and Reward Conditions

	Challenging		Complex		Difficult		Easy		Mean	
Condition	M	SD	M	SD	M	SD	M	SD	M	SD
Positive expectancy										
No reward	2.93	(1.49)	2.29	(1.07)	2.21	(1.31)	2.79	(1.31)	2.56	(1.30)
Reward	2.80	(1.42)	1.93	(0.96)	2.20	(0.86)	2.13	(0.74)	2.27	(1.00)
No expectancy										
No reward	3.07	(1.62)	2.60	(1.64)	2.33	(1.35)	2.60	(1.12)	2.65	(1.43)
Reward	2.67	(1.40)	2.27	(1.16)	2.20	(0.94)	2.20	(0.94)	2.34	(1.11)
Negative expectancy										
No reward	2.87	(1.41)	2.40	(1.35)	2.40	(1.30)	2.67	(1.29)	2.59	(1.34)
Reward	3.13	(1.55)	2.27	(0.96)	2.07	(1.44)	2.13	(0.92)	2.40	(1.23)

Note. High scores indicate the greatest degree of task difficulty.

Table 4.7

Anxiety Measures by Expectancy and Reward Conditions

	Nervous		Calm		Intimidated		Worried		Comfortable		Distracted		Total	
Condition	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Positive expectancy														
No reward	2.07	(1.44)	3.14	(1.23)	1.93	(1.07)	2.00	(1.24)	2.71	(0.83)	2.57	(1.70)	2.40	(1.25)
Reward	2.50	(1.56)	2.79	(1.63)	2.00	(1.36)	1.86	(1.17)	2.57	(0.85)	2.14	(1.10)	2.31	(1.28)
No expectancy														
No reward	2.80	(0.94)	3.07	(1.28)	2.20	(1.01)	2.47	(0.99)	3.20	(1.42)	2.53	(1.25)	2.71	(1.15)
Reward	2.53	(1.25)	2.80	(1.15)	1.73	(0.70)	1.67	(0.72)	2.73	(0.96)	2.53	(1.41)	2.33	(1.03)
Negative expectancy														
No reward	2.53	(1.51)	3.00	(1.85)	2.33	(1.91)	2.27	(1.75)	3.00	(1.41)	2.73	(1.67)	2.64	(1.68)
Reward	2.14	(1.29)	2.86	(1.17)	2.14	(1.10)	1.86	(1.29)	3.00	(1.17)	2.00	(1.36)	2.33	(1.23)

Note. High scores indicate the highest degree of anxiety.

Table 4.8

Task Novelty, Interest, and Motivation measures by Expectancy and Reward Conditions

	Novel		Interested		Motivated	
Condition	M	SD	M	SD	M	SD
Positive expectancy						
No reward	4.14	(1.10)	5.21	(0.97)	4.36	(1.39)
Reward	3.67	(1.18)	4.60	(1.30)	4.07	(1.33)
No expectancy						
No reward	3.93	(1.22)	4.73	(1.53)	4.33	(1.68)
Reward	4.00	(0.85)	4.53	(0.99)	4.36	(1.60)
Negative expectancy						
No reward	3.43	(1.74)	4.73	(1.83)	3.80	(1.90)
Reward	3.47	(1.55)	4.79	(2.01)	4.57	(2.10)

Table 4.9

Mean ratings of "Experimenters'" Behavior

	By "Participants"		By "Experimenters"	
Item	M	Sd	M	Sd
Eye Contact	4.94	(1.15)	4.63	(1.16)
Spoke Slowly	5.03	(1.27)	4.42	(1.01)
Use of body gestures	3.78	(1.31)	3.95	(1.37)
Smiled	5.20	(1.60)	5.01	(1.28)
Use of hand gestures	3.99	(1.43)	4.60	(1.23)
Grimaces	1.83	(1.21)	2.20	(1.28)
Use of eyebrow gestures	3.23	(1.28)	3.12	(1.47)
Spoke loudly	3.88	(1.69)	3.99	(1.33)
Frowned	1.65	(0.95)	1.60	(0.94)
Use of arm gestures	3.40	(1.51)	3.69	(1.42)
Spoke clearly	6.01	(1.11)	5.17	(1.03)
Use of head gestures	3.57	(1.40)	3.22	(1.43)
Read instructions without errors	5.56	(1.57)	4.25	(1.61)

CHAPTER 5

DISCUSSION

This study was designed to investigate the effects of experimenters' expectations and the effects of reward on university students' intrinsic motivation. In this chapter, the findings are summarized and the results are interpreted in terms of experimenter expectancies and CET. The chapter ends with a discussion of the limitations of the present study and directions for future research.

As the results indicated, there were no effects of the experimental conditions on students' intrinsic motivation as measured by time on task during the free-choice period (in the absence of reward). There were also no effects of the treatment variables on performance during the treatment phase. Further, measures of "experimenters'" actual expectancies showed no significant effects on either free-time or attitude measures of intrinsic motivation.

In terms of the questionnaire data, there were no significant effects on perceived competency, task difficulty, participant anxiety, or other items (i.e., task novelty, feelings of interest and motivation after the treatment phase). Additionally, for the positive "experimenter" behaviors as perceived by "participants", there were no significant main effects and no interaction effect.

When intrinsic motivation was measured by self-reported task interest, there was a significant interaction effect of expectancy by reward. The findings indicated that when rewarded "participants" were run by "experimenters" given a positive expectation about reward, they reported less interest in the task

compared to non-rewarded "participants". In contrast, rewarded "participants" run by "experimenters" given a negative expectation about reward reported more interest in the task relative to non-rewarded "participants".

This interaction is the opposite of the hypothesized interaction. Even though "experimenters" were able to recall the expectancy information for their condition, they did not communicate that expectancy to "participants". Instead, they communicated the opposite.

This "reverse" bias phenomenon has appeared earlier in expectancy research (Rosenthal, Fode, & Vikan-Kline, 1960). In Rosenthal et al.'s (1960) study, twelve graduate students administered the standard photo-rating task to 58 undergraduate students. The task and the instructions given to experimenters were similar to those described in Chapter 2. In this study, all experimenters were led to expect mean ratings of +7 on the photo-rating task from all their participants. The motivation level was defined by the incentive offered to experimenters for doing a "good job". Half the experimenters were told that they would be paid two dollars per hour and the other half were told that they would be paid five dollars for doing a "good job". It was predicted that the experimenters offered the higher incentive would be more motivated and would thus obtain more biasing effects from their participants. Rosenthal et al. (1960) found the opposite. The experimenters who were offered two dollars for obtaining "good results" showed the greatest expectancy effects. Rosenthal speculated several causes of the reversal of expectancy effect, although no single interpretation was

satisfactory because the source of the reversal effects could not be determined from the available data (Rosenthal, 1966).

Like the experimenters in the Rosenthal et al. (1960) study, the "experimenters" in the present study also produced data the opposite of what was expected (i.e., the interaction of expectancy by reward on task interest). The significant interaction of expectancy by reward in the present study on measures of negative experimenter behavior offers support for this biasing phenomenon. Recall that for the positive-expectancy condition, rewarded individuals reported that their "experimenters" produced more negative behaviors relative to the non-rewarded group. For the negative-expectancy group, non-rewarded "participants" reported that their "experimenters" produced more negative behaviors than rewarded "participants". These findings suggest that there may have been refusal by "experimenters" to communicate the expectancies provided to them. The non-compliance by "experimenters" was likely unintentional, because according to the suspicion check questionnaire, neither the "experimenters" nor the "participants" reported that the experimenters did anything to affect the "participants'" interest in the task. This interpretation is one possible explanation for the present findings.

The results of the present study also indicated a significant main effect of reward on the measure of self-determination. Across expectancy conditions, rewarded individuals reported feeling less self-determined than non-rewarded individuals.

According to CET (Deci et al., 1999), when people do activities they like, they feel competent and self-determined and their intrinsic motivation is high. When people are rewarded for doing activities they like, CET posits that the reward will be experienced as controlling. This leads to a reduction of a person's perceived competence and self-determination, and ultimately, decreases one's intrinsic motivation. The effect of reward found in this study on participants' self-determination is in accord with CET. However, there were no significant effects on "participants" perceived competence. Even though the reward decreased "participants" feelings of self-determination, reward did not reduce feelings of competency, and did not lead to a reduction of intrinsic motivation measured as free-time during the free-choice period. Thus, overall, the findings of this experiment offer weak support for CET.

Limitations

Most effects in this study were not statistically significant. This may have been due to the weakness of the expectancy manipulation. While most of the "experimenters" were generally able to recall the information supplied to them, their responses were not precise. This was especially true for "experimenters" in the negative-expectancy condition. Recall that for question 2 on the manipulation check given to "experimenters" (see Appendix F), those in the negative-expectancy condition reported that the difference between rewarded and non-rewarded "participants" in terms of how little or how much time they would spend on the task was only .27 minutes. Similarly, for question 3 on the same questionnaire (see Appendix F), when asked to state the exact number of

minutes "participants" would spend on the task during the free-choice period, those "experimenters" running rewarded "participants" reported a mean of 2.8 and those running non-rewarded "participants" reported a mean of 3.93, rather then 2 and 6 minutes respectively, as the information supplied to them suggested.

The inability to recall the expectancy information suggests that the manipulation was not entirely successful. Thus, the "experimenters" could not communicate the expectancy appropriate to their condition. Furthermore, the "experimenters" also did not communicate their own expectancies about the effect of reward on motivation. However, "experimenters" communicated the opposite expectancy as indicated by the measure of task interest. To understand why the induced expectancy was not communicated it may be helpful to examine other expectancy studies.

In the early studies on experimenter expectancies (Rosenthal & Fode, 1963), experimenters were told that their task was to replicate "well-established" findings. In the present study, "experimenters" were given information about the effects of reward on motivation. Specifically, in the current study, they were told the results they should expect to find from their "participants" (free-time on task and task liking) based on previous research. They were not, however, told that they were required to find the same results as had been previously found. The explicit instruction to replicate "well-established" findings may have an important bearing on how experimenters go about conducting the study.

A second issue concerns the remuneration for being an experimenter. In the current study, in addition to their course credit, "experimenters" were told that they would be paid $5.00 for being "experimenters". In two of the expectancy studies by Rosenthal and Fode (1963), experimenters were told that they would be paid double if they found the "proper" results. The double pay incentive may create two issues that could be important to the motivation of the experimenters. First, there was the opportunity to earn twice the money offered for being an experimenter. Secondly, there was an implicit awareness on the part of the experimenters that they would be receiving competency feedback at the end of the experiment. That is, experimenters were offered double pay for producing the "proper" results. Receiving double pay at the completion of the study would confirm if they had produced the "proper" results, thereby attesting to their ability to be good experimenters. This embedded appraisal and the double pay may have been important motivators for communicating expectancies.

In the expectancy studies by Rosenthal and Fode (1963), each experimenter ran several participants through the study. This strategy may have allowed for the experimenters to get comfortable with the procedures. As well, it provided more than one opportunity for experimenters to communicate their expectancies. In the present study, each "experimenter" ran only one "participant" through the study. It may be that the present results were non-significant because "experimenters" needed more time to be comfortable in the experimental setting and more than one opportunity to communicate their expectancy.

Unlike the experimenters in the early expectancy studies (Rosenthal & Fode, 1963), students recruited for this study were undergraduates from an introductory psychology class. As such, they had little experience conducting research and may not have come into contact with some of the benefits of producing "proper" results. Graduate students, on the other hand, contact subtle contingencies by producing good results. That is, they experience such things as respect and envy from their fellow graduate students. In addition, producing "proper" experimental findings may lead to other benefits such as research assistantships and academic publications. Therefore, the level of experience/training as an experimenter may be an additional factor that could influence the communication of an expectancy.

Another issue that may be an important motivator for experimenters to communicate expectancies is that experimenters should see the primary investigator as a person with authority and prestige. Students of Rosenthal may have perceived him this way and may have been highly motivated to please him. In the present study, the graduate students in charge of the sessions may not have been perceived by the "experimenters" as authoritative and/or prestigious researchers. As such, there would be no advantage for the undergraduate "experimenters" to please the graduate researchers. The authority or prestige of the primary investigator, as perceived by the student experimenter, may be a necessary element for an expectancy to be communicated.

Directions for Future Research

Results from the present study demonstrate that the experimental manipulation was not completely successful. For future research, it may be that a stronger manipulation will result in producing an expectancy effect. There are several ways to make the expectancy manipulation stronger. First, senior honors or graduate students could be recruited to act as "experimenters. Instructions to experimenters could be presented by an authoritative and admired researcher (i.e., professor). Experimenters could be told that their task is to replicate well-established findings and they could be offered an extra incentive for doing so. Finally, experimenters could run more than one participant through the study. Future researchers should consider implementing these factors in order to make the expectancy manipulation stronger.

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Appendix A1

Positive-expectancy/reward Information

We are studying people's behavior. A prominent view in psychology is that the strongest motivation to perform an interesting activity occurs when the activity itself is interesting and when people are offered a reward such as money to do the activity. That is, the reward and interest in the task add together to increase motivation.

This means that a person who is initially rewarded for doing an interesting task will spend a lot of time on the task after they have received a reward for doing it. They also will like the activity more. In contrast, if people do an interesting task but are not offered a reward, they will spend less time on it and be less interested in the task.

The participant you will run will be offered a reward to do the task. You can expect that the participant will spend about 6 minutes on the task during the 8-minute free choice period. This is because the participant's motivation to perform the task was increased by reward. You can also expect that the participant will rate task interest as high on the task interest scale.

Positive-expectancy/no-reward Information

We are studying people's behavior. A prominent view in psychology is that the strongest motivation to perform an interesting activity occurs when the activity itself is interesting and when people are offered a reward such as money to do the activity. That is, the reward and interest in the task add together to increase motivation.

This means that a person who is initially rewarded for doing an interesting task will spend a lot of time on the task after they have received a reward for doing it. They also will like the activity more. In contrast, if people do an interesting task but are not offered a reward, they will spend less time on it and be less interested in the task.

The participant you will run will not be offered a reward to do the task. You can expect that the participant will spend about 2 minutes on the task during the 8-minute free choice period. This is because the participant's motivation to perform the task was not increased by reward. You can also expect that the participant will rate task interest as low on the task interest scale.

Negative-expectancy/reward Information

We are studying people's behavior. A prominent view in psychology is that motivation to perform an interesting activity will decrease when people are offered a reward such as money to do the activity. That is, the reward controls their behavior. If the reward (money) is then no longer offered for doing the activity, people feel that there is no reason to do the activity because there is no reward.

This means that a person who is initially rewarded for a task will not spend much time on the task when there is no longer a reward. They also will not like the activity as much. In contrast, if people do things they find interesting and they are not offered money, they will continue to be interested in the task and will spend more time on it.

The participant you will run will be offered a reward to do the task. You can expect that the participant will spend about 2 minutes on the task during the 8-minute free choice period. This is because receiving the money will decrease the participant's motivation to work on the activity. You can also expect that the participant will rate task interest as low on the task interest scale.

Negative-expectancy/no-reward Information

We are studying people's behavior. A prominent view in psychology is that motivation to perform an interesting activity will decrease when people are offered a reward such as money to do the activity. That is, the reward controls their behavior. If the reward (money) is then no longer offered for doing the activity, people feel that there is no reason to do the activity because there is no reward.

This means that a person who is initially rewarded for a task will not spend much time on the task when there is no longer a reward. They also will not like the activity as much. In contrast, if people do things they find interesting and they are not offered money, they will continue to be interested in the task and will spend more time on it.

The participant you will run will not be offered a reward to do the task. You can expect that the participant will spend about 6 minutes on the task during the 8-minute free choice period. This is because the participant's motivation to perform the task was not decreased by reward. You can also expect that the participant will rate task interest as high on the task interest scale.

No-expectancy/reward Information

We are studying people's behavior. In psychology, there are different views regarding people's motivation when they are offered a reward, such as money, to perform an interesting activity.

It is unclear from the research whether a person who received a reward (money) for doing an interesting task will spend more time or less time on the task later, compared to a person who was not given a reward. It is also unclear from the research whether the person who received a reward will like the activity more or like the activity less, compared to a person who was not given a reward. So, it is unclear what we are expecting to find in this study.

The participant you will run will be offered a reward. It is unclear how much of the 8-minute free choice period the participant will spend doing the task. It is also unclear how the participant will rate task interest on the task interest scale.

No-expectancy/no-reward Information

We are studying people's behavior. In psychology, there are different views regarding people's motivation when they are offered a reward, such as money, to perform an interesting activity.

It is unclear from the research whether a person who received a reward (money) for doing an interesting task will spend more time or less time on the task later, compared to a person who was not given a reward. It is also unclear from the research whether the person who received a reward will like the activity more or like the activity less, compared to a person who was not given a reward. So, it is unclear what we are expecting to find in this study.

The participant you will run will not be offered a reward. It is unclear how much of the 8-minute free choice period the participant will spend doing the task. It is also unclear how the participant will rate task interest on the task interest scale.

Appendix A2

Please answer the following questions.

1. Please describe the research that we are doing, according to what you read. What do you think we expect to find?

2. Based on what I read, I expect that the participant will (circle one):

1	2	3	4	5	6	7
spend very little time on the task						spend very much time on the task

3. Based on what I read, I expect that the participant will spend _____ minutes on the task during the 8-minute free choice period.

4. I expect that giving a participant money for performing the task would cause them to (circle one):

1	2	3	4	5	6	7
spend very little time on the task						spend very much ime on the task

5. I expect that giving a participant money for performing the task would cause them to (circle one):

1	2	3	4	5	6	7
dislike the task						like the task

Appendix A3

Data from Manipulation Check

After the participants had read the information they were asked to respond to a 5-item questionnaire. The first question asked participants what effect they thought the study was about. Of those students given the positive expectancy, 82% answered the study was interested in how rewards increase motivation, 80% (8/10) of the students given no expectancy reported that the study was investigating how money decreases motivation, and 100% of the students given the negative expectancy answered that they had no idea what the study was about.

In a second question, participants were asked to rate on a scale of 1-7, whether a participant would spend very little (1) or very much time (7) on a task. The results supported the hypothesized interaction, $F(2, 24) = 4.765$, $p = .018$. There was no main effect of expectancy, $F(2, 24) = .165$, ns, and no main effect of reward, $F(1, 24) = .051$, ns. Participants given the positive expectancy thought that non-reward participants would spend less time on the task than rewarded participants. In contrast, participants given a negative expectancy reported that non-rewarded participants would spend more time on the task then rewarded participants. The scores for the no-expectancy conditions fell in the middle. In summary, this question demonstrated that the expectancy manipulation was successful.

Participants were also asked to state the exact number of minutes a person would spend on the task in the third question. The results supported the

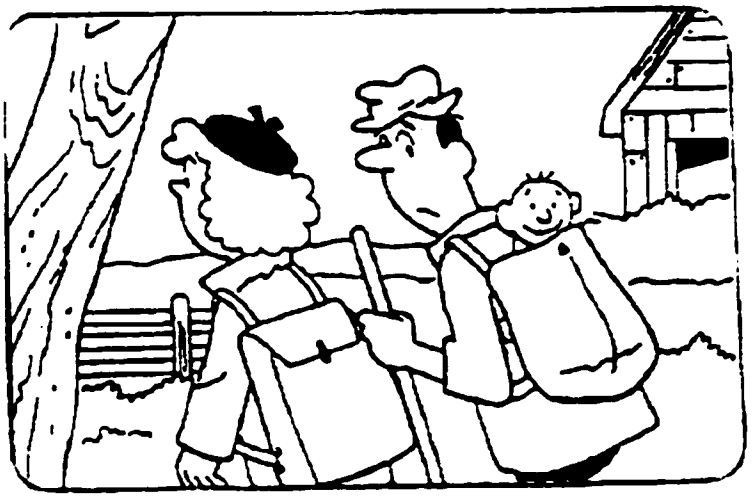
hypothesized interaction, $F(2, 24) = 30.744$, $p < .005$. There was no main effect of expectancy, $F(2, 24) = 1.315$, ns, and no main effect of reward, $F(1, 24) = .112$, ns. Experimenters given a positive expectancy reported that rewarded participants would spend about six minutes on the task and non-rewarded individuals would spend 2 minutes on the task. The minutes expected by the negative expectancy condition were the opposite. Scores for the no-expectancy condition fell in the middle.

The last two questions were designed to assess the participant's own expectancies about rewards. Participants were asked whether they thought giving participants money for performing the task would cause them to spend very little or very much time on the task. I hypothesized an effect of expectancy. The ANOVA results support the hypothesized effect, $\underline{F}(2, 27) = 7.125$, $\underline{p} = .003$. Post hoc tests reveal the mean difference between positive expectancy and negative expectancy and no expectancy and negative expectancy to be significant ($\underline{p} < .05$).

Participants were asked if they thought that giving a participant money would cause them to like (7) or dislike (1) the task. I hypothesized an effect of expectancy. The ANOVA reveals the expectancy effect $\underline{F}(2, 27) = 7.125$, $\underline{p} < .003$ Post hoc tests reveal that only the mean differences between the positive expectancy and the negative expectancy were significantly different ($\underline{p} < .05$).

Appendix B

Sample of the Task



Appendix C

"Experimenter" Consent Form

Informed Consent Form

PROBLEM SOLVING AND BEHAVIOR

I, _____, agree to participate in the study being conducted by Katherine Banko under the direction of Drs. J. Cameron, D. Pierce, R. Frender, and R. Sinclair. I realize that I will be asked to act as an experimenter who has a participant perform a problem solving task involving "finding differences" between two drawings and that I will complete various evaluations on measurement scales. I know that my responses are totally anonymous and that I am free to discontinue participation without penalty. Due to the nature of the hypothesis, I realize that further information at this time could bias the results of the study and that I will be fully debriefed at the end of the session. I realize that the session takes between a half an hour and 1 hour and that I will receive one credit for participation.

Signed _____

Date _____

"Participant" Consent Form

Informed Consent Form

PROBLEM SOLVING AND BEHAVIOR

I, _____, agree to participate in the study being conducted by Katherine Banko under the direction of Drs. J. Cameron, D. Pierce, R. Frender, and R. Sinclair. I realize that I will be asked to perform a problem solving task involving "finding differences" between two drawings and that I will complete various evaluations on measurement scales. I know that my responses are totally anonymous and that I am free to discontinue participation without penalty. Due to the nature of the hypothesis, I realize that further information at this time could bias the results of the study and that I will be fully debriefed at the end of the session. I realize that the session takes between a half an hour and 1 hour and that I will receive one credit for participation.

Signed _____

Date _____

Appendix D

Experimenter Script for a Rewarded Participant

"Hi, are you here for the study"? (yes) **"Could you follow me, please"?**
(Take participant down into the lab. Point to that chair with the tape on it and say)
"Please have a seat". (sit down on the other chair)

(Point to the video camera and say)
"I'll be taping today's session to make sure there's consistency in the procedure".

(Give participant the informed consent sheet and say)
"Could you read this consent form and sign it, please".
(Have them sign it. Turn it over on the table beside you. If at any time they say they do not want to continue with the study, come and get me)

(After they sign the consent form tell them)
"This is a study about problem solving and behavior".

(Take out the sample and place it on the table in front of the participant)
"This is a sample of the task. Use a marker to circle items in the bottom picture that are different from the top picture like this one".

(Take the pictures out of the folder, give them to the participant and say)
"I'd like you to do this task for a few minutes. In addition, I'll give you $5.00 for doing it. It doesn't matter ho many you do or how many you find. I'll leave while you're doing the task. Okay"?
(Leave the room and close the door. Come to the back room and wait with me, I'll tell you when the time is up)

(I'll give you the money and when the time is up, go back in the room and say)
"Please stop now. Here is the $5.00. You can keep it".

(Collect the task and put it back in the folder then say the next line. While you are saying it, point out the pictures and the magazines)
"I need a few minutes before you do the next task. While you are waiting, you can work on more pictures, read magazines, or do what ever you want, but please do not leave the room".
(Bring the folder with the task in it, leave the room, close the door, and come to the back room and wait with me during the free choice period)

(When the time is up, go back into the room and say) **"Thanks for waiting. Now, could you complete this questionnaire"?** (Give them the questionnaire, leave, close the door, come to the back room)

Experimenter Script for a No-reward Participant

"Hi, are you here for the study"? (yes) **"Could you follow me, please"?**
(Take participant down into the lab. Point to that chair with the tape on it and say)
"Please have a seat". (Sit down on the other chair)

(Point to the video camera and say)
"I'll be taping today's session to make sure there's consistency in the procedure".

(Give participant the informed consent sheet and say)
"Could you read this consent form and sign it, please".
(Have them sign it. Turn it over on the table beside you. If at any time they say they do not want to continue with the study, come and get me)

(After they sign the consent form tell them:)
"This is a study about problem solving and behavior".

(Take out the sample and place it on the table in front of the participant)
"This is a sample of the task. Use a marker to circle items in the bottom picture that are different from the top picture like this one".

(Take the pictures out of the folder, give them to the participant and say)
"I'd like you to do this task for a few minutes. In addition, I'll give you $5.00 for doing it. It doesn't matter ho many you do or how many you find. I'll leave while you're doing the task. Okay"?
(Leave the room and close the door. Come to the back room and wait with me, I'll tell you when the time is up)

(I'll give you the money and when the time is up, go back in the room and say)
"Please stop now. Here is the $5.00. You can keep it".

(Collect the task and put it back in the folder then say the next line. While you are saying it, point out the pictures and the magazines)
"I need a few minutes before you do the next task. While you are waiting, you can work on more pictures, read magazines, or do what ever you want, but please do not leave the room".
(Bring the folder with the task in it, leave the room, close the door, and come to the back room and wait with me during the free choice period)

(When the time is up, go back into the room and say)
"Thanks for waiting. Now, could you complete this questionnaire"?
(Give them the questionnaire, leave, close the door, come to the back room)

Appendix E

Graduate Researcher Script

Hi, are you here for the study? Could you follow me, please. You can have a seat here. I'm _____ and I'm working with Dr. Pierce. We are interested in finding out about the role of experimenters in human research addressing problem solving and behavior. You'll be an experimenter who'll have a participant do a problem-solving task. In addition to your experimental credit, I'll pay you $5 to be the experimenter. Before I explain what you're required to do, I'll need you to sign this consent form and sign it.

Another person will be coming in about 15 minutes, and they'll be your participant. When the person arrives, you'll greet them, get them to do the problem-solving task, and then give them what we call a free-choice period. The free-choice period gives them an opportunity to do various activities.

This is the background information you'll need to know as the experimenter. Read it over carefully. While you're doing that, I'll go and get your script. When you're done, turn it over and call me.

Here's your script. You don't have to memorize it, you can keep it with you to read from. Okay, now, let's rehearse it together. You be the experimenter and I'll be your participant. We'll start out in the other room where the participant should be waiting.

Okay, take the participant down to the lab. Then, point to that chair with the tape on it and tell them to have a seat. Point to the camera and say the next line. In this folder are the consent form that they'll sign, and the sample of the task. Give them the consent form and say the next line. Put the consent form back in the folder, then take out the task and put it in front of them and read the next line. In this folder are the pictures they'll work on. Take them out and place them here. Then say the next line.

(Reward Script Only) – don't worry about the $5.00, I'll give you the money to pay them.

When you leave, you'll come into the back room where I'll be. So, we'll wait here while they do it, then I'll tell you when the time is up. Then, you go back in here, ask them to stop and pick up the task and put it in the folder.

Next is the free choice period, the time when the participant can do various activities. Then, you give them the next line. When you say it, make sure you point out the pictures, then the magazines, okay? Then, you come back in the backroom and wait with me. I'll tell you when the time is up. Then, I'll give you this questionnaire and you'll take it in there and ask them to complete it. Then

you come back here where I am. And that's all you're required to do as the experimenter. Okay?

Do you have any questions about what you'll be doing or what you'll be saying? Okay. Then you can wait here and take a look at one of these magazines. I'll go out and wait for the person to arrive and when they do, I'll come and let you know.

Appendix F

Manipulation Check Questionnaire

Please answer the following questions.

1. Please describe the research that we are doing, according to what you read. What do you think we expect to find?

2. Based on what I read, I expect that the participant will (circle one):

1	2	3	4	5	6	7
spend very little time on the task					spend very much time on the task	

3. Based on what I read, I expect that the participant will spend _____ minutes on the task during the 8-minute free choice period.

4. Based on what I read, I expect that after giving a participant money for doing the task she/he would (circle one):

1	2	3	4	5	6	7
spend very little time on the task					spend very much time on the task	

5. Based on what I read, I expect that after giving a participant money for doing the task she/he would (circle one):

1	2	3	4	5	6	7
dislike the task						like the task

1. In my opinion, I think that after giving a participant money for doing the task she/he would (circle one):

1	2	3	4	5	6	7
spend very little time on the task					spend very much time on the task	

2. In my opinion, I think that after giving a participant money for doing the task she/he would (circle one):

1	2	3	4	5	6	7
dislike the task						like the task

"Experimenter' Questionnaire

Using the scale below, circle the number beside each statement that best indicates the degree to which you performed the following behaviors:

I:	1 Not at all	2	3	4	5	6	7 A great deal
Made eye contact with my participant	1	2	3	4	5	6	7
Spoke slowly	1	2	3	4	5	6	7
Used body gestures	1	2	3	4	5	6	7
Smiled	1	2	3	4	5	6	7
Used hand gestures	1	2	3	4	5	6	7
Grimaced	1	2	3	4	5	6	7
Used eyebrow gestures	1	2	3	4	5	6	7
Spoke loudly	1	2	3	4	5	6	7
Frowned	1	2	3	4	5	6	7
Used arm gestures	1	2	3	4	5	6	7
Spoke clearly	1	2	3	4	5	6	7
Used head gestures	1	2	3	4	5	6	7
Read instructions without errors	1	2	3	4	5	6	7

Debriefing Form

Please write answers to each of the following questions.

1) What do you think I was studying?

2) Was there anything that could have affected your performance and/or perceptions other than the task itself? If so, what?

3) Do you think that you could have affected the responses of the participant? If so, how?

4) Did you treat the participant in a manner that suggested that she/he should perform either well or poorly on the task? If so, how?

5) Did you treat the participant in a manner that suggested that she/he would either like or dislike the task? If so, how?

6) Did you give the participant anything that could have affected her/his performance and/or perceptions of the task? If so, what and how?

7) Did you say anything to the participant about how you thought she/he would perform and/or perceive the task? If so, what.

8) We were interested in how the instructions we gave to you affected how you treated the participant and how this affected her/his perceptions of the task. Did you think this? If so, when and why?

9) We were also interested in how being rewarded or not rewarded affected the participant's perceptions of the task. Did you think this? If so, when and why?

"Participant" Questionnaire

Using the scale below, circle the number beside each adjective that best describes your attitudes toward the "Find the Difference" task:

	1 strongly disagree	2	3	4	5	6	7 strongly agree
The task was:							
challenging	1	2	3	4	5	6	7
complex	1	2	3	4	5	6	7
exciting	1	2	3	4	5	6	7
tedious	1	2	3	4	5	6	7
difficult	1	2	3	4	5	6	7
interesting	1	2	3	4	5	6	7
enjoyable	1	2	3	4	5	6	7
easy	1	2	3	4	5	6	7
pleasurable	1	2	3	4	5	6	7
novel	1	2	3	4	5	6	7
good	1	2	3	4	5	6	7

Using the scale below, circle the number beside each adjective that best describes how the "Find the Difference" task made you feel:

	1 strongly disagree	2	3	4	5	6	7 strongly agree
The task made me feel:							
competent	1	2	3	4	5	6	7
pressured	1	2	3	4	5	6	7
free	1	2	3	4	5	6	7
calm	1	2	3	4	5	6	7
comfortable	1	2	3	4	5	6	7
nervous	1	2	3	4	5	6	7
confident	1	2	3	4	5	6	7
worried	1	2	3	4	5	6	7
constrained	1	2	3	4	5	6	7
capable	1	2	3	4	5	6	7
intimidated	1	2	3	4	5	6	7
controlled	1	2	3	4	5	6	7
motivated	1	2	3	4	5	6	7
interested	1	2	3	4	5	6	7
distracted	1	2	3	4	5	6	7

Using the scale below, circle the number beside each statement that best indicates the degree to which the experimenter performed the following behaviors:

The experimenter:	1 Not at all	2	3	4	5	6	7 A great deal
made eye contact with me	1	2	3	4	5	6	7
spoke slowly	1	2	3	4	5	6	7
used body gestures	1	2	3	4	5	6	7
smiled	1	2	3	4	5	6	7
used hand gestures	1	2	3	4	5	6	7
grimaced	1	2	3	4	5	6	7
used eyebrow gestures	1	2	3	4	5	6	7
spoke loudly	1	2	3	4	5	6	7
frowned	1	2	3	4	5	6	7
used arm gestures	1	2	3	4	5	6	7
spoke clearly	1	2	3	4	5	6	7
Used head gestures	1	2	3	4	5	6	7
Read instructions without errors	1	2	3	4	5	6	7

Debriefing Form

Please write answers to each of the following questions.

1) What do you think I was studying?

2) Was there anything that could have affected your performance and/or perceptions other than the task itself? If so, what?

3) Do you think that the experimenter could have affected your responses? If so, how?

4) Did the experimenter treat you in a manner that suggested that you should perform either well or poorly on the task? If so, how?

5) Did the experimenter treat you in a manner that suggested that you would either like or dislike the task? If so, how?

6) Did the experimenter give you anything that could have affected your performance and/or perceptions of the task? If so, what and how?

7) Did the experimenter say anything to you about how she/he thought you would perform and/or perceive the task? If so, what.

8) We were interested in how the instructions we gave to experimenters affected how they treated you and how this affected your perceptions of the task. Did you think this? If so, when and why?

9) We were also interested in how being rewarded or not rewarded affected your perceptions of the task. Did you think this? If so, when and why?

Appendix G

Oral Debriefing

Now that we're done, I can tell you a little more about what we were studying here today. I'm interested in the effects of intrinsic versus extrinsic motivation on task performance and on liking for the task. I'm also interested in how the expectations that experimenters have regarding how a person will perform, and the expectations they have about how much a person will like the task, affects a person's performance and liking for the task. So, one of you acted as the experimenter in the study and you were given one of 3 expectations regarding the outcome of the study. You were told that I thought that rewards would increase performance and liking, or that rewards would decrease performance and liking, or you were given no expectations about the effect of rewards on performance and liking. So, this was one of my independent variables – called experimenter expectancy – it had 3 levels. The second independent variable was whether people received a reward or not. We were measuring the amount of time that people spent on the "Find a Difference" task during the time that the experimenter was away from the room (after people were rewarded or not). This was our primary dependent variable. We also measured people's attitudes toward the task. So, in reality, all of you will get $5.00 (give it to people who were in the no reward condition and to experimenters).

I'm sorry that I couldn't tell you this ahead of time, but I guess that you can see that if I told you that I was studying how experimenter expectations and rewards affected performance and liking for the task, you might have responded differently than you did in the present situation. You might have developed hypotheses about what I was trying to show and you might have behaved based on what you thought I wanted to show, not based on how you actually felt. This idea is call a demand awareness effect and it can be a big problem in research. Does everyone understand why I couldn't tell you everything in advance? Okay.

To be honest with you, in the literature there is a controversy going on about the effects of reward on performance and liking for a task, so I really don't know exactly what we're going to find in this study. If you are interested in the results, you can get in touch with me at the end of the term. My number is on the debriefing information that I'll give you in a few minutes.

I really appreciate your participation. Without people like you participating in research, the science couldn't progress – so, thank you very much. One final thing that I'd like to ask you is, please don't let other people know what I'm doing in this study because if people come in with expectations, or if they think they'll be rewarded, my study will be ruined.

Here's your credit sheet and your debriefing information. Thank you again.

Participant Debriefing Handout

Sometimes psychologists do research in which we do not manipulate variables, but instead measure *predictor* variables and *criterion* variables. Often we collect data during large testing sessions where we do not manipulate anything. For example, we could look at activities you engage in (e.g., music preferences) as a predictor of political attitudes. This type of study would be correlational in nature, and because we did not manipulate any variables, we could not confidently make cause and effect inferences. That is, we couldn't say confidently that a type of activity *causes* differences in political attitudes because some other variable that is correlated with these attitudes (e.g., political knowledge) might be the actual cause of the attitude differences. Thus, there may be other explanations for any observed relationship between music preference and political attitudes. Another reason for collecting data during large testing sessions is so that we can develop norms, that is, typical or "average" responses for questionnaires. For example, one of the studies was designed to determine the distribution of student opinion on a variety of issues of interest to them (e.g., class sizes, condom machines). To do this, we must gather many people's responses to that questionnaire, examine the range of their ratings on the items that measure this belief, obtain the average of those ratings, and so on.

In other studies, like this one, psychologists manipulate independent variables (like expectancy and reward) to assess how these variables cause changes in other variables called dependent variables (like task performance and liking of the task). So independent variables are the theoretical causes, and dependent variables, the variables that we measure, are the effects or outcomes of our independent variables. Random assignment means that each participant has an equal probability of receiving any of the levels of an independent variable. Because of this, we know that different groups of people who receive the various levels of an independent variable are about the same before our manipulations; that is, all groups contain tall people and short people, people who have had a lot of coffee and those who have not, etc. So, height, or amount of coffee, cannot be the cause for any differences in our dependent variables. The only systematic difference between the groups is the level of the independent variable; thus, the independent variable is the most likely cause of any change in our dependent variable.

Part of the scientific process involves building on previous research in order to attempt to clarify issues and lead to new discoveries. The findings in the present work will lead to modifications of theory and other testable hypotheses which, in turn, should lead to other hypotheses, and so on. This is how science builds on previous work and is known as the functional approach to theory development. We often identify issues raised in journals, point out problems, extend issues, or modify theories in order to advance our understanding. As you can see, it is very important to have research participants so that scientific endeavors can continue. Your participation not only helps to advance science, but is also meant to help you understand how we conduct research when we address important psychological issues.

We did not tell you ahead of time what our hypotheses are. If we had done so, you might have felt pressure or some *demand* to respond or react a particular way, based on what you thought we wanted rather than on your typical or normal response. When people respond based on what they believe the researcher is looking for, this is called the *demand awareness effect*. This can be a problem in research because our results would not accurately reflect your responses. If this did occur, scientific progress would be affected because inappropriate avenues of research might be followed. Therefore, we inform you about the nature of a particular study AFTER you have participated in it.

If you have any questions about this study, please contact Katherine Banko at 492-2349 or through email kbanko@ualberta.ca.