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**Carstens, Christian B.**

**RETROSPECTIVE DISCOUNTING AND AUGMENTING IN AN  
OVERJUSTIFICATION PROCEDURE**

*The University of North Carolina at Greensboro*

**PH.D. 1983**

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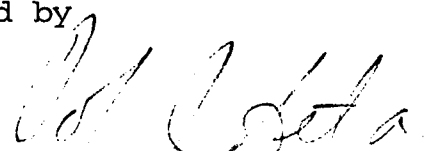
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Salient reward procedures can lead to decrements in the subsequent value or intrinsic motivation for an interesting target activity. Attributional analyses explain this phenomenon in terms of discounting: performing an interesting activity for an incentive induces an external attribution of causality, which is associated with a corresponding decrease in perceived intrinsic motivation. Nonattributional hypotheses explain the value decrement in terms of differential performance during the treatment session. Expected rewards can produce distraction, hurried performance, stereotyped responding, and other effects, all of which can interfere with the enjoyment of the target activity. Three experiments were conducted in which differential performance during the treatment session was ruled out by the use of a retrospective misattribution procedure. Adult subjects performed target activities while listening to background music. After the "treatment" session, but prior to the free-choice test session, experimental subjects were told that the music contained subliminal messages either encouraging or discouraging target activity performance. There were, in fact, no subliminal messages, so that all subjects were treated in the same way during the initial performance session. Overjustification or countercompliance effects occurred only

when the instructions included a salient attempt at control coupled with negatively valenced means of control. Neither feedback indicating functional control nor salient attempts at control were sufficient to produce countercompliance. The results were discussed in terms of cognitive balance theory.

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## CHAPTER I

### INTRODUCTION AND LITERATURE REVIEW

Within the past three decades, psychologists have adapted learning principles to the therapeutic modification of human behavior. These procedures have produced successful results in industry, in educational settings, and with institutionalized populations once regarded as untreatable. The learning-principles approach (e.g., Skinner, 1953) provided some distinct advantages to the field of therapeutic behavior change relative to more traditional approaches. Among these advantages was parsimony; treatment programs could be designed and evaluated with an emphasis on the functional relationships between environmental variables and observable behavior. This functional analytic approach allowed the prediction of behavior change without reference to theoretical constructs such as super-egos, attitudes, cognitions, and selves.

Concurrent with the rise of behavior modification, experiments derived from cognitive dissonance theory (Festinger, 1957) began to produce results that were not easily explained within the context of a Skinnerian approach to human behavior. Studies in the area of forced compliance (e.g., Bem, 1967; Festinger & Carlsmith, 1959) suggested that small rewards were more effective than larger rewards in producing certain kinds of behavior change. In the forced

compliance procedure, subjects were offered either a small or a large reward for engaging in some counterattitudinal activity. Postreward measures indicated a larger degree of attitude change, consistent with the rewarded activity, for the small-reward subjects relative to the large-reward subjects. This effect has been explained in terms of the subject's attributions about the functional cause of the rewarded behavior (Bem, 1967; Kelley, 1967). The large reward provided sufficient justification for the counterattitudinal activity, so that minimal attitude change occurred. The small reward, however, was theoretically insufficient to justify the behavior, so subjects tended to misattribute their activities to changes in attitude. This phenomenon, and related findings, led many social psychologists to believe that the effects of rewards and other behavior modification procedures may best be understood by taking into account the processes of cognitive inference.

The finding that "insufficient" rewards were instrumental in producing attitude change led to speculation concerning the effects of "oversufficient" rewards (deCharms, 1968; Lepper, Greene, & Nisbett, 1973). If insufficient rewards lead subjects to attribute performance to internal factors, then oversufficient rewards might produce a bias towards a perception of external causality. To the extent that task engagement and disengagement are mediated by perceptions of locus of causality, one outcome of oversufficient

rewards might be a postreward performance decrement relative to prereward levels. This phenomenon, termed the overjustification effect (Lepper et al., 1973) and the decreased play effect (Reiss & Sushinsky, 1975), has indeed been demonstrated in many laboratory and field experiments.

The interaction of extrinsic and intrinsic motivational factors has received a great deal of attention for a number of reasons. Several investigators (e.g., Levine & Fasnacht, 1974; Notz, 1975) have suggested that extrinsic rewards may undermine intrinsic motivation, produce superficial learning, and adversely affect the quality of performance. Condry (1977) proposes that external inducements can have deleterious effects on exploratory behavior in general.

The overjustification effect also has implications for some broader theoretical issues in social psychology. The use of intrinsic motivation as a conceptual variable reflects current dissatisfaction with theories that attempt to explain human motivation as being directly related to biological need reduction (e.g., Deci, 1975; Hunt, 1965; Kelly, 1955; White, 1959). Overjustification research also attempts to address the relationship between attributional processes and noncognitive behavior. Finally, some psychologists believe that an understanding of intrinsic motivation will help in the study of creativity (e.g., Amabile, 1979; McGraw, 1978).

The purpose of the present paper is to investigate the interaction of intrinsic and extrinsic motivational factors.

The focus is on the attempt to construct a theoretical understanding of the psychological processes involved, rather than the implications for the therapeutic use of learning principles with human populations. (For discussions of the implications of intrinsic motivation for applied problems, see Arkes, 1978; Deci & Ryan, 1980; Ford & Foster, 1976; Levine & Fasnacht, 1974; Notz, 1975; Fuoco, Note 3).

The present paper is organized as follows: First, the overjustification paradigm is discussed. Then the theoretical approaches to overjustification are briefly reviewed. The theoretical review is followed by a comprehensive empirical review. After a brief subjective discussion of the state of the art, a series of original investigations is presented.

### The Overjustification Effect

The overjustification effect is defined as a reduction in intrinsic motivation following task performance under extrinsic conditions that demand performance. Intrinsic motivation has been operationally defined in terms of performance in a free choice situation or as verbal preference ratings for the target activity. Performance measures include the following: (1) proportion of free time spent on the target activity, (2) number of units of the target activity completed during the free-choice session, and (3) whether the target activity is selected first during

free choice assessment. Verbal measures include (1) ratings of the target activity on affectively-toned semantic differential items, (2) Likert scale ratings of "liking" for the target activity, and (3) subjects' reported willingness to volunteer for unpaid task performance. Since there is no consensus among researchers that all of these types of measures provide equally valid indices of intrinsic motivation (e.g., Arnold, 1976), the use of verbal or performance measures is specified in this review.

One of the earliest demonstrations of overjustification was reported by Deci (1971). Adult subjects were given access to an interesting puzzle task during a three-session procedure. The first and third sessions were free choice situations. During the second session, subjects in the reward group were offered money for playing with the puzzles, while a control group was neither offered nor received any payment. Between-group comparisons indicated less time spent with the puzzle game in session three for the rewarded subjects relative to the controls.

Deci's (1971) studies were marred by a number of methodological flaws, including the use of inappropriate statistical tests, unusually liberal p-values, and possible between-groups differences during the initial baseline period (Calder & Staw, 1975a; Scott, 1976). Another major problem was the failure to report performance data from the second session. The offer of money may have increased responding so that the

reward group spent more time on the target activity as compared with the control group. If this were the case, then the postreward performance decrement may have been due to fatigue or boredom.

A more convincing demonstration of an overjustification effect was provided by Lepper, Greene, and Nisbett (1973). Using a three-session procedure, school children were given the opportunity to perform a drawing task. Following the initial free-choice session, one group of children was offered an award for drawing during the second session. A second group was given an unanticipated reward at the end of the second session, while a control group was neither offered nor given any extrinsic reward. Postreward free-play assessment showed that the expected-reward group spent less time on the drawing task as compared with the unexpected-reward and the control conditions. The reward manipulations did not produce any significant differences among the groups in second-session performance, so that fatigue and boredom were ruled out as explanations for the postreward decrement.

These early experiments stimulated a great deal of research on the overjustification effect. That research is reviewed below following a brief description of the major theoretical analyses that have been used to explain overjustification phenomena.

## Theories of Overjustification

### Attributional Analyses

Attribution theory is concerned with the ways in which people acquire knowledge, and how that knowledge affects subsequent behavior. The central tenet of the attributional analysis of overjustification effects is that these effects are mediated by the individual's causal inferences. People observe their own behavior and the conditions under which that behavior occurs. This information is then used to form an hypothesis about the cause of the behavior, which in turn affects the motivation to perform.

DeCharms (1968), along with others (e.g., Deci, 1975; Hunt, 1965; White, 1959) has been critical of psychology for overemphasizing the role of external and homeostatic factors in human motivation. Traditional motivational theories would lead one to believe that most significant human activities are performed in order to avoid pain or to reduce the intensity of aversive internal tension states. DeCharms argues that many activities, especially creative endeavors and play behaviors, are intrinsically motivated.

The critical concept in DeCharms' analysis of intrinsic motivation is the basic human need for freedom of choice. Individuals perceive themselves in any given situation along an Origin-Pawn dimension. To the extent that salient external controlling factors are at a minimum, the individual sees himself as a free agent, an Origin of behavior. Salient



external controlling factors, such as reward contingencies, lead the person to see himself as a Pawn. As a general rule, the latter situation is aversive; a self-perception of lack of freedom induces the person to behave in such a way as to increase the feeling of free choice. When a previously free behavior is constrained by the imposition of an external reward contingency, the motivation to perform the rewarded activity decreases.

Kelley (1967, 1973) has developed a model of the kinds of causal heuristics used in various situations. For the purposes of the present paper, three principles of causal attribution are particularly important. First, people are aware that any given event can have a number of potential causes, so that the attributional process involves a selection among possible causal factors. Second, people tend to assign causality to a single antecedent variable, as opposed to a more rigorous scientific analysis which might involve multiple antecedents and interactions among antecedents (L. Ross, 1977). Finally, Kelley's discounting principle is important in overjustification. The discounting principle states that any potential cause will be discounted to the extent that other plausible causal factors are available.

Assuming the truth of these principles, an individual who is rewarded for performing some activity would experience the following psychological processes. The individual would wonder why he is performing, and he would answer that question on the basis of available data. There would be at least

two possible explanations: (1) the behavior is intrinsically motivated ("I'm doing it because I enjoy it") or (2) the behavior is extrinsically motivated ("I'm doing it for the money."). A salient incentive would induce the actor to attribute his performance to external factors, so that the importance of intrinsic motivation is discounted. Any post-reward decrements in performance or verbal preference for the target activity would be a reflection of the reduction in perceived intrinsic motivation.

A similar prediction may be derived from self-perception theory (Bem, 1967, 1972). Self-perception theory is an attempt, originating out of a Skinnerian behaviorist tradition, to describe the formation of attitudes about oneself. According to Bem, beliefs about the self arise primarily from observations of public events, while private stimuli available only to the individual may play a minor role in self-perception. In many situations, then, both an outside observer and an actor should use the same kind of analysis and reach similar conclusions about the motivation behind the actor's behavior. We come to like those activities which we perform frequently in the absence of salient constraints, while our attitudes are less positive towards activities that tend to occur primarily under compelling external circumstances.

It should be noted that self-perception theory deals with the formation of attributions about the self on the

basis of behavioral data, but the theory explicitly does not attempt to explain the noncognitive behavior:

In attribution models generally--and in self-perception theory in particular, cognitions or self-attributions are the dependent variables. Instrumental behaviors, consummatory responses, and physiological responses (real or falsified) are among the variables which can serve as the independent or antecedent variables, the stimuli from which self-attributions of beliefs, attitudes, or internal states can be partially inferred by the individual. Attribution models are thus very explicit about the direction of the causal arrow, and they remain mute about any phenomenon in which non-cognitive response classes play the dependent variable; as dependent variables, such response classes are extra-theoretical. . . . How do attributional models account for non-cognitive response classes? They don't! Self-perception can get us from the stimulus manipulation to the attribution. It cannot get us from the attribution to anything beyond that. (Bem, 1972, p. 47)

Many investigators (e.g., Calder & Staw, 1975b) in the overjustification area have assumed, implicitly or explicitly, that the self-perceptions can and do mediate a variety of noncognitive response classes. Thus, self-perception theory has been used to account not only for attributional dependent variables, but for other dependent variables as well.

Cognitive evaluation theory (Deci, 1975, 1976; Deci, Cascio, & Krusell, 1975; Deci & Ryan, 1980) is a theory of human motivation that emphasizes intrinsic motivation and mediating cognitions. Intrinsic motivation is defined as the innate need to feel competent and self-determining. Intrinsic motivation plays an especially important role in play, exploration, and the acquisition of knowledge for its own sake. Deci and his colleagues suggest that there are two general

classes of intrinsically motivated behaviors, those that are directed towards seeking challenge and behaviors that serve to conquer challenge. Intrinsically motivated activities are controlled by the central nervous system; intrinsic motives "have no appreciable effect on non-nervous system tissues" (Deci, 1975, p. 132). Finally, intrinsic motivation serves both to energize and direct behavior.

People are motivated by an awareness of potential satisfaction (feelings of competence and self-determination). This awareness is associated with hypotheses concerning the probability that various behaviors will lead to satisfaction. The individual then chooses a course of action likely to lead to satisfaction. If the outcome falls short of some internal standard of competence and self-determination, then some secondary course is pursued. This "TOTE" (Test-Operate-Test-Exit) sequence (Miller, Gallanter, & Pribram, 1960) is repeated until the outcome matches the internal standard of satisfaction, or until the individual gives up and seeks satisfaction in entirely different situations.

Deci (1975) points out that people need not be aware of the "awarenesses" that motivate behavior. Thus, there is no reason to expect that self-report measures would accurately reflect the interplay between cognitions and performance.

External reward procedures initiate two opponent processes with respect to intrinsic motivation. The controlling aspect of reward provides feedback about self-determination.

Salient external rewards lead to a perception of an external locus of causality, which is associated with a reduction in feelings of self-determination. The informational aspect of reward provides the individual with feedback concerning competence with respect to the rewarded activity. The effects of rewards on intrinsic motivation depend upon the relative strengths of the two aspects of reward. If the controlling aspect is the more salient component, then perceived intrinsic motivation declines, and a postreward performance decrement should occur. If the informational aspect outweighs the controlling aspect, then perceived intrinsic motivation increases, and the residual effect of reward should be an increment in free-play performance. Thus rewards can serve to either increase, decrease, or have no effect on postreward performance.

It should be noted that all of the attributional approaches to overjustification discussed above involved the concept of discounting. Salient external demands (incentives, audience, etc.) lead to a discounting of intrinsic motivation. This reduction in intrinsic motivation then produces postreward performance and verbal preference decrements.

#### The Competing Response Hypothesis

Reiss and Sushinsky (1975, 1976) have proposed an alternative explanation of the overjustification effect. According to the competing response hypothesis, an extrinsic reward

may elicit responses that are incompatible with the performance of the target activity. A salient incentive may induce any of the following reactions: selective attention directed towards the reward rather than towards the task; cognitions focused on the reward which may interfere with task performance; attention directed towards the person dispensing reward; an increase in general arousal. Any of these responses may interfere with performance quality and task enjoyment, so that the rewarded subject has less opportunity to learn to enjoy the target activity. The overjustification effect is thus a manifestation of the reduced quality of performance during the contingency session.

The competing-response hypothesis makes several predictions concerning the conditions that should strengthen or attenuate the overjustification effect. First, the overjustification effect should be attenuated when multiple rewards trials are used as compared with a single reward trial procedure. This prediction is based on the assumption that repeated presentations of the reward will result in habituation of the competing responses. Second, the overjustification effect should be most likely to occur when the reward procedure does not produce reinforcement effects, since reinforcement would indicate that the reward procedure has not disrupted performance.

A more specific account of the competing response hypothesis is the delay of gratification hypothesis (Ross, Karniol,

& Rothstein, 1976). According to this analysis, anticipating a reward produces frustration, especially in young children. Because the frustration is associated with the target activity, that activity acquires aversive properties. One prediction derived from this analysis is that overjustification effects will occur independently of the specific nature of the reward contingency, since the anticipation of reward contiguous with the performance of the target activity is the only necessary condition.

#### Williams' Two-factor Model

Williams (1980) proposed that any reward procedure has both excitatory and inhibitory components with respect to the target activity.<sup>1</sup> The excitatory component is termed "reward value." Reward value can be assessed by the magnitude of the reinforcement effects produced within the overjustification experiment or by transituational preference measures. The inhibitory aspect of reward is "behavior constraint."

Behavior constraint increases with the extent to which a request to perform specifies performance required in order to obtain the reward and with the degree of perceived threat of consequences for non-compliance. Behavior constraint decreases with the extent to which the subject can choose his or her behavior during the contingency period and with the increased perception of freedom of choice concerning whether to participate in the contingency. (Williams, 1980, p. 602)

The net residual effect of a reward procedure depends on the relative strengths of behavior constraint and reward

value. If behavior constraint is the more heavily weighted component, an overjustification effect should occur. Conversely, a post-reward increment in performance should occur when the reward value component is stronger than the behavior constraint component. One prediction derived from the 2-factor model is that the magnitude of reinforcement effects during the contingency period should be inversely related to the magnitude of post-reward performance decrements (Williams, 1980).

The 2-factor model is similar to Deci's cognitive evaluation theory in that both analyses propose inhibitory and excitatory components in extrinsic reward procedures. There are two important differences. First, the two-factor model does not provide any conceptual definition of intrinsic motivation; rather, intrinsic motivation is a description of the probability of behavior in a free-choice situation. Second, Williams (1980) argues that the controlling properties of reward do not cause overjustification effects, since control is demonstrated by reinforcement or incentive effects, which are inversely related to overjustification effects.

#### Behavioral and Incentive Contrast

Several investigators (e.g., Feingold & Mahoney, 1975; Fuoco, Note 3; Mawhinney, 1979) have noted that the overjustification paradigm is in some ways similar to the successive behavioral/incentive contrast procedures used in animal



learning studies.<sup>2</sup> These investigators have suggested that overjustification effects may best be understood as a subset of behavioral contrast effects, and that the integration of the two literatures may prove helpful.

Mawhinney (1979) suggests that an operant analysis of reinforcement can be used to explain overjustification phenomena. Dunham (1977) has proposed an optimal duration theory of reinforcement which predicts systematic transitory postreward effects. Optimal duration theory is an extension and modification of Premack's (1971) analysis of reinforcement and punishment. According to Premack, the value of an activity for a given organism can be estimated from the duration of that activity in a free-choice situation. Higher valued activities should serve as reinforcers for lower valued activities, while lower valued activities should function as punishers for more highly valued behaviors.

Dunham (1977) modified Premack's analysis by suggesting a more molecular analysis of value. Value, according to Dunham, is a function of both the optimal duration of an activity and the optimal inter-bout interval in an unconstrained situation. Sexual activity, for example, is valuable to the extent that the individual is allowed sufficient time to complete the act. Similarly, the value of sexual activity should decline if the organism is forced to continue participation past the optimal duration. The activity is valued to the extent that freedom to perform at the appropriate intervals is available.

Reinforcement, according to Dunham, contains an inhibitory component in that it disrupts the optimal durations and/or intervals of the target activity. When a behavior is effectively reinforced, the organism is constrained to perform either for a duration that is longer than optimal, or at less than optimal intervals, or both. When the contingency is removed, and the contingency change is discriminable, the organism will compensate for the constraint induced by previous reinforcement. If reinforcement produced durations longer than the optimal duration, the transitory residual effect will be durations of less than optimal. Similarly, constraining the organism towards shorter inter-bout intervals results in compensatory intervals that are greater than optimal.

The optimal duration analysis suggests that the occurrence of overjustification effects is directly related to the degree of disruption produced by the reward contingency. There should be a direct relationship between the magnitude of reinforcement and the magnitude of overjustification effects. Also, the duration of overjustification phenomena should be directly related to the duration of the contingency. Finally, overjustification effects should not occur for behaviors of maximum or near maximum initial value, if those behaviors occur at such a high frequency that they cannot be reinforced (Mawhinney, 1979).

The optimal duration analysis also suggests some methodological procedures for the study of overjustification phenomena. Since no a priori predictions of the nature of reinforcers are made, single-subject designs with sufficiently long pretreatment baselines provide the most appropriate test of the model.

### Reactance Theory

Ransen (1980) has suggested that reactance theory may be useful in understanding overjustification effects. Reactance theory (Brehm, 1966; Wicklund, 1974; Wortman & Brehm, 1975) states that eliminating or threatening to constrain the availability of some previously free behavior will lead to attempts to reinstate that behavior. These attempts at reinstatement are manifest in increased reported preference or increased performance of the threatened activity. Reactance effects increase in magnitude as a direct function of (1) the initial value of the threatened activity, (2) the severity of the threat, and (3) the number of free behaviors that are threatened or eliminated. Reactance effects should occur whether the source of the threat is intentional or accidental, social or nonsocial.

Two assumptions are necessary in order to apply reactance theory to an analysis of overjustification effects. First, it must be the case that external constraints such as rewards pose a threat (or perceived threat) to the free engagement of some set of unrewarded activities. Second,

the decrements in intrinsic motivation for the target activity following an external constraint procedure actually represent excitatory effects on that set of unrewarded activities.

Wortman and Brehm (1975) have recently attempted to integrate reactance theory and learned helplessness theory (Seligman, 1975). It is argued that the probability of reactance effects diminishes rapidly as the subjective probability of reinstating the threatened behavior approaches zero. Initial instances of threat, then, should lead to an increase in the value of the threatened activity. If the threat continues, the probability of reinstatement diminishes, and the threatened activity is devalued. This approach would predict that overjustification effects would be unlikely following extended periods of external constraint, as might be the case in several multiple-reward sessions.

#### Personal Equity Theory

Personal equity theory (Seta & Seta, 1982) is an economic model based in part on social equity theory (Adams, 1965). According to personal equity theory, an individual's rewards and costs in a given situation are evaluated through an intrapersonal comparator process. The theory assumes that, for a particular target activity, there exists a range of cost or reward that corresponds to the value of the activity. For a low-valued activity, an individual might expect that he or she should receive a certain range of reward for

performing the activity. Similarly, the individual has some expectation that a range of cost should be incurred in order to participate in a highly valued activity.

Personal equity theory suggests that the outcomes of various overjustification procedures can be analyzed in terms of the ranges of value associated with both the target activity and the incentive. Consider a situation in which an attractive incentive is offered for a boring or low-value task. Assuming that the incentive value is greater than the range of value associated with the task, the subject is receiving a communication that the experimenter considers the task to be valuable. Under these circumstances the subject's value of the activity may increase towards the experimenter's implicit value. However, increasing the incentive value even further may lead the subject to expect that the activity, especially if it is a novel activity, is more valuable than it can possibly be. Subsequent performance would violate this unrealistic expectation, leading to a devaluation of the activity.

In a similar fashion, both increments and decrements in the value of an interesting target activity would be predicted from personal equity theory. Minimal rewards should lead to devaluation of an high-value target activity, while much larger rewards should produce value increments.

For the purposes of the present paper, the following points should be made concerning personal equity processes

in an overjustification procedure. First, we should expect interactions between the magnitude of reward and the initial value of the target activity. Second, the effects of different reward magnitudes on subsequent target activity value should produce nonlinear functions. Third, to the extent that incentive procedures constitute a violation of freedom of choice, this would input into the comparator process as a cost factor.

A final point about personal equity theory concerns the operation of the comparator system itself. Seta and Seta have shown that by making certain input variables more or less salient, value shifts occur as if the salience manipulations have produced different weightings for the factors. It may also be the case that aspects of the situation may trigger the operation of the comparator system itself. In the typical overjustification study, subjects are offered some reward for doing a particular activity. This may comprise an invitation for the subjects to engage in task-reward comparisons. Such comparisons are less likely to occur in the standard control conditions, in which there is no mention of any reward. An intrapersonal economic analysis may be less likely to occur in the latter situation. In other words, the typical oversufficient justification procedure may be evoking two independent operations: (1) it increases the likelihood that the subject makes economic comparisons, and (2) it provides a particular reward input for the comparison.

## Literature Review

### Saliency

According to the attributional analysis of the overjustification effect, reductions in intrinsic motivation are most likely to occur when the reward is made very salient. Saliency should increase attention to the reward, which would then increase the probability of attributing performance to the reward. M. Ross (1975) manipulated saliency in two different ways. In the first experiment, the reward was either present or absent during the contingency period. During the free play assessment period, performance of the target activity was significantly reduced in the reward-present group, relative to the reward-absent group and an unrewarded control group. There were no significant differences in postreward performance for the reward-absent and the control conditions. In Experiment 2, Ross manipulated reward saliency by instructions. A think-reward group of children were told to concentrate on the reward during the contingency period. Children in the nonideation group were simply promised a reward. In a distraction condition, subjects were instructed to think about an irrelevant event (a recent snowfall) during the reward session. Finally, an unrewarded control group was included in the design. Postreward performance scores indicated a reduction in intrinsic interest for the think-reward and nonideation conditions relative to the control condition. Performance in the control and distraction conditions

did not significantly differ. These results provide partial support for the salience hypothesis. Ross suggests that the lack of differences between the think-reward and non-ideation may have occurred because the non-ideation children tended to concentrate on the reward although they were not explicitly told to do so. The distraction instructions apparently reduced concentration on the reward so that an overjustification effect did not occur.

Lepper et al. (1973) manipulated salience by using either unexpected or expected rewards. Post-reward performance scores indicated a reduction in intrinsic motivation only for the expected-reward condition. This effect has been replicated in other experiments (Lepper & Greene, 1975; Greene & Lepper, 1974; W. E. Smith, 1974).

Reiss and Sushinsky (1975; Experiment 1) used a 2 x 2 factorial design to investigate the effects of reward salience. Half of the subjects received expected reward, while half received unexpected reward. Within these conditions, half of the subjects were exposed to the reward at the beginning of the contingency session, while the remainder of the subjects were not exposed to the reward. Analysis of post-reward performance scores indicated a significant main effect for expectations, with reduced performance in the expected reward relative to the unexpected reward condition. The main effect for exposure and the interaction were not significant. The fact that mere exposure did not reduce



postreward performance is important. This finding suggests that the reward stimulus must be presented as a reward in order for performance-reward instrumentality to be enhanced.

Kruglanski, Riter, Amitai, Margolin, Shabtai, and Zaksh (1975) examined salience in terms of whether external reward is typically an integral part of the target activity. For some "money-intrinsic" tasks, such as penny-pitching, monetary reward is typically associated with the activity. For "money-extrinsic" tasks, monetary payment is unusual (salient). In two conceptual replications, Kruglanski et al. crossed money-intrinsic task vs. money-extrinsic task with reward vs. no reward. Postreward preference ratings indicate that payment reduced intrinsic interest in the "money-extrinsic" tasks, while payment increased preference for the "money-intrinsic" tasks. Interpretation of these data are difficult. First, Kruglanski et al. provide no satisfactory explanation as to why reward should increase intrinsic motivation in the "money-intrinsic" tasks (Deci & Ryan, 1980). Second, the two studies contain a conceptual confound. The data indicate that the "money-intrinsic" and "money-extrinsic" tasks differ in initial value, with the "money-intrinsic" being less valued. Thus the results can be interpreted as demonstrating that rewards enhance intrinsic motivation for boring tasks and undermine intrinsic motivation for interesting activities.

In general, the literature indicates that rewards are most likely to reduce intrinsic motivation when the reward is highly salient. It should be noted that other independent variables (e.g., reward magnitude) might be interpreted as salience manipulations; these factors are treated in separate sections.

#### Initial Interest in the Target Activity

Since research in the overjustification area is concerned with changes in intrinsic motivation, most studies have used tasks that are either demonstrated or assumed to be highly interesting for the subject population. A few experiments, however, have systematically varied the initial value of the task. Calder and Staw (1975) had adult male subjects perform either an interesting puzzle task, with unclad women, or a boring task (blank puzzles). Post-reward verbal preference measures indicated that monetary reward decreased intrinsic motivation for the interesting task, while reward increased preference for the boring task. This interaction has been replicated by a number of investigators, using post-reward performance as an index of intrinsic motivation (Lee, Syrnyk, & Hallschmid, 1977; McLoyd, 1979; Loveland & Olley, 1979; Carstens, Beck, & Reavis, 1982, Note 1. The Carstens et al. study also found that reward had no effect on target activities of intermediate initial value.

Three studies have provided partial replication of the results of Calder and Staw (1975). Danner and Lonky (1981) and Upton (1973) found that reward decreased intrinsic motivation for an interesting activity, while no change occurred when a less interesting activity was rewarded. Hamner and Foster (1975) found an increase in intrinsic motivation when a boring task was rewarded, while reward had no effect on intrinsic motivation for an interesting task. If one assumes that the tasks in which no effect occurred were of intermediate value, then the results of the three studies described above are consistent with the Calder and Staw (1975) data.

One published report has yielded data that are inconsistent with the rest of the literature on the interaction of extrinsic reward and initial value. Greene, Sternberg, and Lepper (1976) designed a classroom token economy system in which children were rewarded for performing various mathematics activities. Children were assigned to either high or low initial interest groups according to individual baseline performance. Following the termination of the token economy, between-groups performance measures indicated a decrease in intrinsic motivation for the low-value group and no overjustification effect for the high-value group. Although the Greene et al. study differed methodologically from the previously reported studies, including the use of multiple

rewards and assessment sessions over several weeks, the reason for the discrepant data is not clear.

With the exception of the Greene et al. (1976) study, the research indicates that reward increases intrinsic motivation for dull activities, decreases intrinsic motivation for interesting tasks, and has little effect on tasks of intermediate value. Given the consistency of the research findings, it is somewhat surprising that little attempt has been made to explain the interaction of extrinsic reward and task value within an attributional framework. Calder and Staw (1975) argue that the interaction follows from self-perception theory, although they do not present the derivation. In fact, self-perception theory would lead to the prediction that reported preference for a highly interesting activity would decrease following reward, and that the detrimental effects of reward would be attenuated for a boring activity to the extent that a floor effect occurs. It is not clear how self-perception theory would suggest an increase in reported value of a boring task following reward. Self-perception theory makes no prediction about performance measures of intrinsic motivation (Bem, 1972).

Deci and Ryan (1980) propose an alternative explanation for the interaction of reward and initial value. The decrease in intrinsic motivation for interesting activities is due to the effects of the controlling aspects of reward. The

increase in preference or performance for dull tasks does not represent an increase in intrinsic motivation, but rather an increase in task satisfaction. Deci and Ryan (1980) do not clearly differentiate the conceptual distinction between task satisfaction and intrinsic motivation, although the concepts apparently share common operational definitions. It would seem that changes in post-reward preference or performance that are explicable from cognitive evaluation theory represent changes in intrinsic motivation, while other post-reward effects are indices of task satisfaction.

Williams' (1980) 2-factor model provides a means of explaining the interaction between extrinsic reward and initial value. Two assumptions are necessary. First, let us assume that the constraining aspect of a given reward procedure is equivalent for both high- and low-value activities. Second, consider that the magnitude of the reward value component is a function of the relationship between the value of the target activity and the value of the reward. Given a common reward, the reward value increases as the initial value of the target activity decreases. Thus, for a highly interesting activity, the reward value component is outweighed by the constraining aspect of reward. The opposite is true for a target activity of low initial value. For target tasks of intermediate value, the magnitude of constraint

and reward value should be roughly equivalent, so that no net change in intrinsic motivation will occur.

Finally, Reiss and Sushinsky (1976) have argued that the interaction of reward and initial value is consistent with the competing-response hypothesis. To the extent that reward distracts attention from an interesting task, interest in that task should increase. Conversely, a reward might enhance interest in a low-value activity by diverting attention from the activity's boring features.

#### Enhancing and Attenuating External Attributions

According to the attributional analysis of intrinsic motivation, one of two possible mediating conditions is necessary for the overjustification effect to occur: (1) the subject makes an external attribution during the contingency period, and this external attribution persists into post-reward assessment to mediate performance/preference, or (2) some event occurs after the contingency period that induces a retrospective external attribution. Experiments by Carstens and Seta (Note 2) and Fazio (1981) investigated the characteristics of the post-reward performance session that would enhance or attenuate the persistence of the external attribution. Carstens and Seta argued that the persistence of an external attribution should be affected by the potential for new information about the target activity in the test situation. If the test situation provides no new information about the previously rewarded task, the

external attribution should persist, and an overjustification effect should occur. If, however, the test situation provides new information about the target activity, the subject should re-engage in an attributional analysis, so that performance is no longer mediated by the outdated external attribution. Carstens and Seta gave subjects either money or no reward for listening to a particular selection of classical music. For half of the subjects, the contingency and postreward sessions contained the same choices of classical music, while the nonrewarded tape differed across sessions for the remainder of the subjects. Time spent listening to classical music decreased following reward only when the test situation provided no new samples of classical music, thus supporting the predictions concerning the persistence of external attributions.

Fazio (1981) manipulated the persistence of reward-induced external attributions by introducing information that was inconsistent with the external attribution. Children were either rewarded or not rewarded for performing a drawing task. Just prior to the test session, half of the children were shown a photograph of themselves performing the target activity during a free-play baseline, i.e., under conditions of intrinsic motivation. An overjustification effect occurred only in the no-photograph reward condition. Presumably the photograph induced a reexamination of the external attribution formed during the contingency session.

Kruglanski, Alon, and Lewis (1972) demonstrated that an overjustification effect might be mediated by an external attribution that develops after the reward session. Children were either rewarded or not rewarded for participating in a group activity. The reward group had not been led to expect any reward prior to participation in the target activity. When the reward was delivered, however, the children were told that they had been promised reward earlier. Postreward preference measures indicated lower ratings for the target activity in the reward group vs. the no-reward group. In addition, there was a significantly greater tendency for children in the reward condition to attribute their participation to the offer of incentive, even though this could not have been the case.

Finally, two published studies (Dollinger, 1979; Pittmann, Cooper, & Smith, 1977) attempted to manipulate causal attributions by the use of directive cues associated with the reward procedure. Dollinger (1979) gave children either an expected or unexpected reward for solving puzzles. Half of the subjects were told that they surely enjoyed the task as reward was delivered, while the remaining subjects were told that they surely must enjoy the reward. Post-reward performance measures yielded a Cue x Expectation interaction: the two expected-reward conditions did not differ, while intrinsic interest was higher for the task-cue cell relative to the reward-cue cell in the unexpected reward conditions.



Pittman et al. (1977) used a false physiological feedback procedure to affect causal attributions. Rewarded subjects were told, during the contingency session, that GSR readings indicated either interest in the task or in the reward. Another rewarded group received no false feedback, while a control group received neither reward nor feedback. Reward reduced postreward performance in all conditions, but the performance decrement was attenuated for the task-cue condition.

#### Developmental Effects

The attributional analyses of overjustification phenomena demand the operation of certain cognitive capacities in the subject. First, the subject must be aware that there are multiple potential causes for any given effect. Second, the subject must use the discounting principle (Kelley, 1973) to choose among potential causes. Attributional research has made it abundantly clear that adults use multiple causal schemata and discounting. Young children, on the other hand, do not seem to make consistent use of discounting, yet they behave very much like adults in overjustification procedures (see Sedlak & Kurtz, 1981, for a review).

Several experiments (e.g., Baldwin & Baldwin, 1970; Karniol & Ross, 1979; M. C. Smith, 1975) have shown that children under 6 years of age tend to use an additive rather than a discounting strategy in social inference. M. C. Smith, for example, presented subjects with a story in which an

actor performs an activity either under an incentive condition or in an unconstrained situation. Fourth-graders and adults showed evidence of discounting by attributing greater intrinsic motivation to the unconstrained actor. Kindergarten children seemed to use an additive rule in attributing greater intrinsic motivation to the rewarded actor. Second-graders were transitional, displaying a mixture of discounting and additive causal attribution.

Given the lack of evidence of the use of discounting in preschoolers, an attributional analysis would predict that overjustification effects would not occur with this population. On the contrary, the use of an additive inference rule would suggest that prior reward should increase intrinsic motivation. Several experiments (e.g., Anderson, Manoogian, & Reznick, 1976; Dollinger & Thelen, 1978; Loveland & Olley, 1979; M. Ross, 1975) have obtained overjustification effects with preschoolers. Morgan (1981) conducted two experiments to investigate the relationship between inferential schemata and overjustification effects. In Experiment I, children ranging in age from 5 to 11 years were each given an additive-discounting test similar to the procedure used by M. C. Smith (1975). From this pretesting subjects were then classified as either additive, discounting, or transitional. Cognitive categorization was highly correlated with age, such that 5-year-olds tended to be additive, 8-year-olds to be transitional, and 11-year-olds to be discounting. All children

then participated in a standard overjustification experiment. At each cognitive stage, postreward performance decrements occurred, as compared with unrewarded controls. Experiment II was a replication in which all subjects were 8 years old. Again, overjustification effects occurred at all three cognitive stages.

There are three potential explanations for the discrepancy between attributional predictions and the absence of developmental effects in overjustification. First, it may be the case that nonattributional analyses provide a better explanation of overjustification effects. The merits of competing hypotheses are discussed at length elsewhere in this paper. Second, self-perception processes may underlie adult overjustification effects, whereas other perhaps more "primitive" processes may operate to produce overjustification effects in young children. Finally, it may be the case that the tests used to classify subjects into causal schemata categories may be poor indices of self-perception processes (Sedlak & Kurtz, 1981; Morgan, 1981).

Sedlak and Kurtz (1981) have suggested that a problem with the methods of categorizing children into schemata groups may underlie the absence of a relationship between overjustification effects and causal schemata. Shultz and Butkowsky (1977) have shown that a given child can be classified as either additive or discounting depending upon the method of testing. Kindergarten children were presented with verbal accounts and videotaped sequences of social behavior.

The videotape presentation produced inferences consistent with discounting, while the verbal items produced a mixed additive-discounting analysis. Young children may be more likely to use more sophisticated causal heuristics when the data are more salient or meaningful, as might be the case in a self-perception analysis.

### Multiple Reward Procedures

Researchers have been interested in investigating overjustification effects following multiple reward procedures for two reasons. First, the competing response hypothesis (Reiss & Sushinsky, 1975, 1976) suggests that the probability of an overjustification effect should diminish as the number of reward trials increases. Recall that this hypothesis attributes postreward motivational decrements to the distracting effects of rewards during the contingency period. Assuming that the capacity of the incentive to elicit responses that are incompatible with task performance and enjoyment diminishes over repeated exposures, then multiple reward presentations should produce little or no overjustification effects.

The second reason for interest in multiple reward procedures is the suggestion that applied token economy programs may have deleterious effects (e.g., Levine & Fasnacht, 1974). While there can be no doubt that token programs can influence behavior during the operation of the contingency, the justification for such programs is the maintenance of desired behavior patterns in the absence of a prosthetic environment.

Many behavior modifiers have noted that the withdrawal of tokens often results in a behavioral regression to pre-treatment levels (see Kazdin & Bootzin, 1972, for a review). The failure of token economics to produce robust behavior change that generalizes across time and situations may be due to the undermining effects of rewards, or to the neglect of the behavior modifier to design the program so that intrinsic motivation will be enhanced.

Smith and Pittmann (1978) designed a laboratory experiment to test the predictions of the competing response hypothesis in a multiple reward trial situation. Adult subjects performed a maze activity for 10, 25, or 50 experimental trials. Rewarded subjects were paid on a trial basis. Distraction subjects received no reward, but heard a taped lecture during the maze task. Control subjects were neither distracted nor rewarded. Neither the reward nor distraction manipulations had a significant effect on experimental session performance. Postexperimental, free-choice behavior indicated that intrinsic motivation was reduced for rewarded subjects relative to controls. Free-choice behavior did not differ for the distraction and control conditions. Finally, the number of experimental trials had no effect on subsequent intrinsic motivation. These data suggest that it is the anticipation of reward, rather than distraction, which underlies the overjustification effect.

E. Fisher (1979) and Fuoco (Note 3) investigated the effects of token reward on clinical populations of adult psychiatric patients. Both studies used reversal designs with behavior assessed over a period of several weeks. Both studies used basic hygiene-housekeeping tasks as target activities. The tokens produced a reinforcement effect and a post-reward overjustification effect in both investigations. In the Fuoco (Note 3) study, the overjustification effect was eliminated by pairing the tokens with praise.

Greene et al. (1976) also found that overjustification effects can occur in token economies. Children were rewarded either for specific math activities, or they were non-differentially rewarded for participating in any experimental activities. Post-reward free-play performance scores indicated a reduction in intrinsic motivation for children who were differentially rewarded either for low initial value activities or for their choice of target activities. No overjustification effect occurred for the high-value activities.

Several other token reward programs have failed to yield overjustification effects (Davidson & Bucher, 1978; Feingold & Mahoney, 1975; Mynatt, Oakley, Arrkelin, Piccione, Margolis, & Arrkelin, 1978). In each of these studies, children received multiple rewards over a period of several days. The rewards produced significant reinforcement effects in each case. In the Feingold and Mahoney (1975) and Davidson

and Bucher (1978) studies, the reinforcement effect was maintained after the withdrawal of rewards.

The research on token economies indicates that overjustification effects can occur with multiple reward procedures. The conditions that are necessary for an undermining of intrinsic motivation have not yet been satisfactorily identified. The sparseness and ambiguity of the research findings certainly do not justify the abandonment of applied multiple reward procedures. This is especially true in light of the fact that token economies often employ procedures that should minimize overjustification effects, such as (1) the selection of low initial value activities as target tasks, (2) avoidance of abrupt withdrawal of reward, and (3) attempts to use social and naturally occurring rewards rather than artificial or arbitrary rewards.

#### Reinforcement and Incentive Effects

The presence or absence of a reinforcement or incentive effect during the contingency period is an important variable in the overjustification effect according to a number of theoretical approaches.<sup>3</sup> According to the attributional analyses, reductions in intrinsic motivation are mediated by the perception that the reward procedure is controlling performance of the target activity. It follows, then, that perceptions of external causality will be most likely to occur when the reward procedure does indeed have a controlling effect. An attributional approach could thus predict a

direct relationship between reinforcement/incentive effects during the contingency period and overjustification effects during postreward assessment. Nonetheless, some attributional theorists (e.g., Deci, 1975; Lepper & Greene, 1976) have argued that prior reinforcement/incentive effects are not critical to the occurrence of overjustification effects. This latter position is also consistent with a general attributional framework: if the external conditions are very salient, self-attributions may be based almost entirely on those external conditions, with self-perception of behavior per se providing very little input (Bem, 1972). Thus, reinforcement/incentive effects may or may not be critical determinants of mediating attributions, depending on the salience of the external potential causal factors.

Williams' (1980) 2-factor model proposes that reward procedures have both an excitatory and an inhibitory component. The excitatory component is reward value, which is inferred from the magnitude of reinforcement effects. The probability of an overjustification effect is directly related to the strength of the inhibitory component and inversely related to the amount of reward value. Thus the two-factor model and the attributional analyses make opposite predictions concerning reinforcement effects and overjustification effects.

The competing-response hypothesis (Reiss & Sushinsky, 1975, 1976) also predicts an inverse relationship between



prior reinforcement and postreward performance. According to this analysis, rewards can elicit a variety of cognitions and noncognitive behaviors which are incompatible with a full enjoyment of the target activity. The overjustification effect reflects the distracted contingency period performance of rewarded subjects. A reinforcement effect during the contingency session should mean that the incentive is not interfering with performance, so that an overjustification effect is unlikely.

Finally, reinforcement/incentive effects are critical to behavioral contrast analyses of overjustification (e.g., Feingold & Mahoney, 1975; Mawhinney, 1979; Fuoco, Note 3). Behavioral contrast notions would predict a direct relationship between reinforcement/incentive effects during the contingency period and postcontingency overjustification effects.

Table 1 represents a summary of the available data on the relationship between reinforcement/incentive effects. The summary would suggest that reinforcement/incentive effects are neither necessary nor sufficient antecedents of overjustification effects. This proposition should be made with some caution, however, because the overjustification literature is not characterized by systematic attempts to investigate reinforcement/incentive effects. This neglect is illustrated by the following points:

- (1) Many studies contain no reports of contingency session performance.

(2) Many studies have only verbal measures of intrinsic motivation, which may be less sensitive than performance measures in terms of identifying reinforcement relationships.

(3) Most experiments use between-subjects comparisons, as opposed to the typical operant investigation in which reinforcement variables are examined using within-subject designs.

(4) Most of the overjustification experiments use single-reward procedures and a brief (e.g., 10-min) contingency session, in contrast to the multiple-reward, multiple session designs used in the operant analysis of reinforcement.

(5) Few overjustification studies have included precise pre-experimental measures of individual reward-activity value relationships.

(6) Very few overjustification studies have systematically varied the magnitude of reward across several levels, while keeping the qualitative nature of the reward constant.

#### Reward Magnitude

Surprisingly few published studies have manipulated several different levels of reward magnitude while keeping the qualitative nature of the rewards constant. The attributional and competing-response analyses would predict a direct relationship between magnitude of reward and magnitude of overjustification effects. A behavioral contrast approach would also predict a direct relationship, if there is a

direct relationship between reward magnitude and the magnitude of reinforcement/incentive effects. Williams' (1980) 2-factor model, on the other hand, would suggest an inverse relationship between reward magnitude and overjustification effects. This prediction is based on the assumption that the behavior constraint component of reward remains constant as the reward value component increases. It would be just as reasonable to assume that both reward value and behavior constraint increase as a function of increasing reward magnitude, especially if the higher levels of reward have a stronger reinforcing (constraining) effect.

Williams' (1980) found an inverse relationship between the value of a reward and the occurrence of overjustification effects. Children were rewarded for task performance with either highly valued or less valued comic books. The highly valued comic book produced a significant incentive effect, while the low-valued reward did not. Subsequent performance measures indicated that an overjustification effect, relative to unrewarded controls, occurred only in the low-valued reward condition. E. Fisher (1979) found evidence of a direct relationship between reward magnitude and the occurrence of overjustification effects. In a within-subjects reversal design, institutionalized patients performed self-care skills for one token, five tokens, or no payment. Both token procedures produced a significant reinforcement effect, with the five-token procedure having a greater reinforcement

effect than the one-token procedure. No-token sessions that were immediately preceded by five-token sessions produced significantly less target activity as compared with no-token sessions that were immediately preceded by one-token sessions. Finally Farr et al. (1977) found no relationship between three levels of monetary payment and subsequent performance and verbal measures of intrinsic interest, nor were the different payment levels associated with different performance levels during the contingency session.

The conflicting results and the dearth of evidence allow no conclusions as to the relationship between reward magnitude and residual intrinsic interest. This is unfortunate, since the variable is important in both theoretical and applied terms.

#### Reward Contingency

Several overjustification studies have examined the specific way in which the reward contingency is described to the subject.<sup>4</sup> There are two reasons why this variable is considered to be important. Deci (1972) suggested that the controlling aspect of reward should vary according to the reward contingency. In piece-rate and minimum performance criterion pay schedules, the reward is directly tied to performance. These payment schedules emphasize the instrumentality of the target activity, so that a maximum reduction in intrinsic motivation should occur. If rewards are contingent only on participation in the target activity, however, the subjects

are less likely to make external attributions, and the overjustification effect should be attenuated.

Reward contingency is also an important variable within the context of the delay of gratification hypothesis (Ross et al., 1976). This hypothesis states that a delay between the promise and the delivery of reward can be frustrating, especially to young children. Through association, this frustration can make the target activity aversive. In addition, the frustration state may be accompanied by behaviors and cognitions that are incompatible with performance of the target task (Reiss & Sushinsky, 1975, 1976). The delay of gratification hypothesis would predict, then, that the precise nature of the contingency is not a critical variable in undermining intrinsic motivation.

Several studies have found that the nature of the contingency does have an effect on intrinsic motivation. Ross et al. (1976) compared the effects of a wait contingency with a participation contingency on post-reward target activity performance. They found that the participation contingency produced an undermining effect relative to an unrewarded control group, while the wait contingency did not produce an overjustification effect. Similarly, Swann and Pittmann (1977) found that postreward free-play was reduced by a participation contingency but not by a wait contingency. Pinder (1976) demonstrated that adult subjects who had experienced a piece-rate reward schedule were less likely to

freely engage in an interesting target activity relative to subjects who had been rewarded for participation in the task. The piece-rate schedule also produced lower preference ratings for the target task as compared with the participation schedule. Finally, the piece-rate subjects were more likely than the participation subjects to attribute their motivation to the reward.

Harackiewicz (1979) compared the residual effects of a minimal criterion contingency with a participation contingency. Both payment schedules reduced intrinsic motivation, but the reduction was significantly greater for the criterion contingency schedule. Harackiewicz measured intrinsic motivation with a statistical combination of both verbal and performance measures. C. Fisher (1978) found that a piece-rate schedule resulted in a greater tendency toward external attributions relative to a participation contingency, but the two conditions did not differ significantly in verbal measures of intrinsic motivation. Farr, Vance, and McIntyre (1977) found that piece-rate schedules reduced postreward free-play performance as compared with a participation contingency. Piece-rate treatment led to higher intrinsic motivation than did participation payment, however, on verbal measures of intrinsic motivation. Piece-rate payment resulted in more external attributions of causality than did the participation contingency.

While the studies cited above tend to support the notion that piece-rate and criterion contingencies are more

detrimental to intrinsic motivation than participation contingencies, other experiments find no effect for reward contingency. Farr (1976) found no differences in either post-reward performance or verbal measures between piece-rate and participation schedules. Weiner and Mander (1978) found that reward reduced free-play performance relative to unrewarded controls, but the undermining effect was the same for participation and piece-rate schedules. Hamner and Foster (1975) found no differences in verbal measures of intrinsic motivation when comparing participation, piece-rate, and no-payment conditions.

Enzle and Ross (1978) obtained results that were directly opposite of the predictions derived from cognitive evaluation theory. Higher levels of payment reduced verbal measures of intrinsic interest in participation contingencies, while high payment increased intrinsic motivation in criterion contingencies. Karniol and Ross (1977) also found that a reduction in postreward play with the target activity occurred following a participation contingency but not with a criterion contingency.

Rosenfield, Folger, and Adelman (1980) suggested that the ambiguous results described above may be due to the fact that the contingency per se is not a critical variable in the overjustification effect. Rosenfield et al. referred to Deci's analysis which states that the controlling aspect of reward decreases intrinsic motivation and the informational

aspect may increase intrinsic motivation. All salient reward contingencies will probably be perceived as controlling behavior. The specific nature of the contingency does not, however, allow precise predictions concerning the amount of competency information that the subject infers. In the case of a participation or wait contingency, each subject must determine the level of competence achieved on the basis of a very limited amount of information. Similarly, criterion or piece-rate payment doesn't necessarily imply excellent or outstanding performance. Rosenfield et al. suggest that only when specific competency feedback is provided to the subject can a precise prediction be made concerning the strength of the enhancing effect of reward. Rosenfield et al. tested this hypothesis by crossing three payment levels with high and low competency feedback and participation versus piece-rate contingencies. They found that when rewards reflected a high degree of skill, intrinsic motivation, assessed by verbal and performance measures, was enhanced. Conversely, rewards associated with low competence undermined intrinsic motivation. These effects occurred regardless of whether a participation or a piece-rate contingency was used.

#### Verbal Rewards and Competence

According to cognitive evaluation theory (Deci, 1975; Deci & Ryan, 1980), any reward procedure has both controlling and informational aspects. To the extent that the controlling



aspect is salient, the reward procedure will decrease perceptions of self-determination and intrinsic motivation. If the information provided by rewards leads the person to see himself as competent at performing the target activity, intrinsic motivation will increase. Thus rewards may either increase or decrease intrinsic motivation, depending upon the relative salience of the two aspects of reward. Deci and his associates have argued that when praise is used as a reward, the informational component tends to outweigh the controlling component. Praise is more likely to be perceived as an index of increasing competence and less likely to be seen as an explicit attempt at control, as compared with tangible rewards.

Deci (1972) tested his hypothesis using a 3 x 2 design in which three levels of monetary payment (no money, immediate payment, and delayed payment) were crossed with two levels of praise (praise vs. no praise). Only the monetary payment variable had a significant effect on postreward free-play performance times. The praise variable produced no significant effects either as a main effect or in interaction with monetary payment.

Anderson, Manoogian, and Reznick (1976) compared the effects of praise and "good player" awards with children as subjects. Postreward performance measures indicated that intrinsic motivation decreased following the awards and increased following praise.

Fuoco (Note 3) investigated the residual effects of rewards in a token economy with institutionalized mentally retarded adults. During the reward phase, subjects received either praise, tokens, or a combination of praise and tokens for performing housekeeping tasks. A control group was not rewarded. All three of the reward conditions produced a significant reinforcement effect during the contingency phase. The praise and combination procedures had a significantly greater reinforcement effect than did the tokens-only procedure. After rewards were withdrawn, an overjustification effect occurred only in the tokens-only group.

Swann and Pittmann (1977) conducted an overjustification experiment with children comparing the effects of tangible reward with a combination of tangible reward and praise. Using the first activity selected during free-play as a dependent measure, a reduction in intrinsic motivation occurred for the tangible reward group but not for the combination group.

Dollinger and Thelen (1978) investigated praise and tangible rewards with preschool and elementary school subjects. One group of children received food for performing a maze task while a second group was praised. Postreward performance was significantly less for the food condition relative to the unrewarded control. Intrinsic motivation for the control group and praise group did not significantly differ.

Deci (1971) performed two experiments to assess the residual effects of monetary and verbal rewards. In the first experiment, adult subjects worked on a puzzle task for monetary payment or no reward. There were no significant differences between the groups in postreward performance of the target activity. Experiment III was a replication of Experiment I, except that praise was used as a reward. The praise had no significant effect on performance measures of intrinsic motivation.

Harackiewicz (1979) found that tangible rewards decreased intrinsic motivation while praise enhanced intrinsic, as measured by performance and verbal preference measures.

Weiner and Mander (1978) used three levels of verbal feedback crossed with reward-no reward. Following performance during the contingency session, adult subjects were told that their performance was either below average, average, or superior to the work of other subjects. While the monetary reward reduced intrinsic motivation as measured by postreward performance, the feedback manipulation had no significant effect on performance. The feedback had a marginally significant effect on willingness to volunteer for a similar experiment in the future, with level of competence being directly related to willingness to volunteer.

Danner and Lonky (1981) predicted that the residual effects of praise would interact with the individual's locus of control. They reasoned that children with an internal

locus of control would perceive praise as an index of competence, such that intrinsic motivation would be enhanced. Children with an external locus of control would tend to see praise as an external constraint, which would lead to a decrement in intrinsic motivation. Children in this experiment performed for either praise, awards, or no payment. Postreward performance indicated that awards were detrimental to intrinsic reward for those children whose initial interest in the target activity was high. Praise decreased intrinsic motivation only in children with an external locus of control and a high initial interest in the task. Praise had no significant effect on the remaining categories of subjects.

The conflicting results discussed above suggest that whether the reward is social or tangible is not a critical variable in determining the occurrence and magnitude of over-justification effects. Rather, the degree to which the reward manipulation provides feedback as to the subject's competence at performing the target activity may be a critical element (Arkes, 1978). This notion of competence feedback has also been proposed to account for the confusion of results in the investigation of the reward contingency (Rosenfield et al., 1980). Unfortunately, there is a very poor match between the theoretical propositions concerning the relationship between competence and intrinsic motivation, and the experiments that have been used to investigate

competence. The theories of intrinsic motivation (e.g., Atkinson, 1974; Deci, 1975, White, 1959) either suggest or explicitly state that an inverted-U function describes the relationship between competence and intrinsic motivation. Intrinsic motivation should be highest with tasks having a moderate probability of success, with intrinsic motivation being lowest when the individual is extremely incompetent or extremely competent. While the theoretical formulations suggest a curvilinear relationship, the experimental designs typically use two levels of the competence manipulation, so that the result necessarily suggests a linear relationship or no relationship. Thus, it has been found that intrinsic motivation is lower for tasks that are difficult to complete to criterion level relative to tasks with an easier success criterion (Bandura & Schunk, 1981; C. Fisher, 1978). However, this relationship should easily be reversed simply by using different competence manipulations. Hopefully, further research on this issue will employ multiple levels of competence manipulations and thus provide a better test of the relevant theories.

### Choice

The discounting of intrinsic motivation should occur to the extent that any plausible external reason for performance is available. Thus any manipulation that reduces the perception of free self-determination should reduce intrinsic motivation (DeCharms, 1968; Deci, 1975). In addition, the

undermining effects of a reward procedure should be attenuated if the reward procedure allows choice or the illusion of choice (Dollinger & Thelen, 1978).

Dollinger and Thelen (1978) investigated personal control by manipulating the manner in which rewards were delivered. Children were asked to perform a maze activity. One group was rewarded on a piece-rate basis, while another group gave themselves rewards according to their own discretion. Residual performance scores showed an overjustification effect for the self-reward group, but not for the piece-rate group, relative to an unrewarded control condition. These data were not consistent with predictions derived from cognitive evaluation theory (Deci, 1975).

Two other studies have yielded results that are inconsistent with cognitive evaluation theory. Folger, Rosenfield, and Hays (1978) crossed a choice manipulation with a reward variable. Subjects performed for either an expected reward or no reward. Half of the subjects were led to believe that participation in the contingency was purely voluntary, while half were simply told to participate. A significant interaction occurred in the postreward performance scores. Reward increased intrinsic motivation in the low-choice condition, while reward decreased intrinsic motivation for the high-choice subjects. Similar results were found by Greene et al. (1976). Using a multiple-reward token procedure, subjects were assigned to conditions according to prereward baseline performance. High-interest

subjects were rewarded for the activities most preferred during baseline, while high-choice subjects were allowed to choose their own target activities from the various baseline activities. A postreward performance decrement, relative to a nondifferentially-rewarded control group, occurred in the high-choice condition but not in the high-interest condition.

Swann and Pittmann (1977) found results that were partially supportive of cognitive evaluation theory. Children performed a drawing task for expected reward or no reward. Half of the children were led to believe that they had a choice of target activities, but all subjects were subtly induced to select the drawing activity. There were no significant differences among groups in postreward performance measures. Analysis of the first activity selected during postreward free play indicated a significant Reward and Choice interaction. The reward manipulation had no effect in the low-choice conditions. In the high-choice conditions, nonrewarded children chose the target activity more often than did the rewarded subjects. The no-reward, high-choice produced the highest proportion of first selection of the target activity.

Folger et al. (1978) explained the failures to confirm Deci's (1975) predictions by using an equity theory (Adams, 1965; Walster & Berscheid, 1973) analysis. According to this approach, persons are motivated to achieve an equivalence of

input-output comparisons between the two actors in a social dyad. When an experimenter delivers overly sufficient reward, the subject is in a state of inequity. This inequity can be reduced by increasing task performance so that the subject's output moves toward the level of the input of the reward. This motivation toward equity should occur, however, only when the subject has freely entered into the situation; inequity (dissonance) is not aroused when the subject is forced to participate in the contingency. Thus, overly sufficient rewards should increase intrinsic motivation in high-choice situations, while other factors (e.g., discounting) may decrease intrinsic motivation when reward is given in a low-choice situation.

#### Other Manipulations

All of the theoretical approaches to overjustification contain some notion of control, constraint, or disruption (real or imagined) imposed by reward procedures as being critical to changes in intrinsic motivation. Therefore, any number of manipulations that might lead to differing perceptions of external control should have an effect on intrinsic motivation. Performing in front of an audience, for example, might lead the individual to perceive himself as being motivated to obtain positive external evaluation and/or avoid negative external evaluation (e.g., Cottrell, 1972; Good, 1973; Seta & Hassan, 1980; Weiss & Miller, 1971). Lepper and Greene (1975) found that prior performance under



the surveillance of a television camera led to a reduction in postreward performance of the target activity as compared with subjects who performed without surveillance. Amabile (1979) found that anticipation of external critical evaluation produced lower-quality artwork and reduced verbal preference measures of intrinsic motivation. Similarly, the imposition of a deadline led to a reduction in expressed interest in a target activity (Amabile, De Jong, & Lepper, 1976).

Deci, Betley, Kahle, Abrams, and Porac (1981) tested the hypothesis that competition, which involves the imposition of external comparisons, reduces intrinsic motivation. College students performed a puzzle activity under either competitive or non-competitive conditions. There was no significant difference between the groups on post-reward performance measures. It is quite possible that competition can have a number of effects on intrinsic motivation (e.g., increased feelings of competence) other than producing an external locus of causality (Deci & Ryan, 1980).

Finally, if the imposition of extrinsic reward procedures leads to a decrease in intrinsic motivation, then removing or reducing the magnitude of external reward should increase intrinsic motivation. Weick (1964) recruited volunteers for an experiment with explicit instructions that the subjects would receive course credit for participation. Upon arriving at the experiment, half of the subjects were told that the anticipated course credit would not be given. Both verbal

and performance measures indicated an increase in intrinsic motivation for subjects who had the reward withdrawn relative to subjects receiving the anticipated reward. Staw (1974) conducted a field study investigation of intrinsic motivation towards Reserve Officer's Training Corps (ROTC). Staw reasoned that many of the candidates had joined the ROTC program for external reasons, to avoid being drafted. The candidates subsequently drew a draft lottery number that changed the probability of being drafted. Subjects with high lottery numbers (low probability of being drafted) showed an increase in expressed liking for ROTC.

The two studies just reviewed raise an interesting point. If the removal or reduction of external constraints leads to an increase in intrinsic motivation, why do overjustification effects occur at all? One might argue that, in the standard postreward performance situation, the lack of external constraints would lead to an internal attribution, so that no overjustification effects would occur. Clearly, if attributional analyses are to develop into precise theoretical statements, the finer points concerning the persistence of causal attributions must be investigated (Carstens & Seta, Note 2).

#### Quality of Performance

A number of experiments have explored the possibility that incentives can have deleterious effects on the quality of contingency-session performance. Kruglanski, Friedman,

and Zeevi (1971) found that children anticipating reward, relative to unrewarded controls, exhibited reduced creativity, decrements in recall of task features, and lower reported preference for the target activity. Kruglanski et al. suggested that reward induces concentration on rate of production in order to obtain reward, whereas unconstrained subjects are more likely to attend to features of the task itself. In addition to attentional and cognitive effects, rewards may induce affective states that interfere with performance.

A number of studies have yielded results consistent with those of Kruglanski et al. (1971). Lepper et al. (1973) found that children anticipating reward produced lower-quality drawings than did children not expecting reward. Gabarino (1975) examined the effects of expected reward on children's tutoring skills. Rewarded children were more demanding and more critical, while unrewarded tutors were more likely to use praise. The learners had fewer errors with unrewarded tutors.

Morgan (1981) obtained data supporting Kruglanski et al.'s (1971) contention that anticipation of reward may produce affective arousal. Children in Morgan's study were rated by an experimenter on their level of enjoyment during contingency-session responding. Rewarded subjects received significantly higher enjoyment ratings than did unrewarded controls. No evidence was presented, however, indicating that differences in enjoyment were correlated with level of performance on the puzzle task.

McGraw and McCullers (1979) found results indicating that incentives can interfere with performance on a complex cognitive task. Adult subjects performed a series of ten water-jar problems under conditions of anticipated reward or no reward. The first nine problems all required the same solution set, while the tenth problem involved a different solution set. There were no differences among groups in solution time on problems 1-9. On Problem 10, however, mean solution latency was significantly longer for the rewarded group. Interestingly, verbal preference measures for the water-jar task yielded no significant effects.

Other studies have failed to replicate the finding that the anticipation of reward is associated with qualitative performance decrements. Fazio (1981) and Loveland and Olley (1979) found no differences between rewarded and unrewarded children in quality of drawings, similar to the task used by Lepper et al. (1973). Enzle and Ross (1978) found that reward had no effect during the contingency period on either number of puzzles attempted or number successfully completed. Reward conditions had no effect on the quality of maze performance in children in a study reported by Dollinger and Thelen (1978). Pritchard et al. (1977) found no effect of reward on either number of chess problems attempted or successfully solved.

A few studies have examined the correlations between an individual's contingency-session performance quality on

subsequent interest in the experimental task. Ransen (1980) found a modest negative correlation ( $r = -.30$ ) between quality and postreward decline in performance times. This correlation is consistent with Reiss and Sushinsky's (1975) assertion that reductions in intrinsic interest following reward result from low-quality play. Ross et al. (1976) and Pritchard et al. (1977) found no significant correlations between quality measures and postreward intrinsic interest.

Although the findings are ambiguous, it does appear that anticipated rewards may have immediate detrimental effects on quality of performance. It should be noted that most overjustification studies have not specifically been designed to provide sensitive qualitative measures.

It is not clear at this point what the relationship is between immediate qualitative and residual motivational effects. Reiss and Shusinsky (1975, 1976) argue that decreased postreward performance is caused by low-quality play. Kruglanski et al. (1971) argue that both types of effects are the result of the individual's cognitive orientation toward the target activity during contingency session performance. McGraw and McCullers (1979) suggest that the data do not provide strong support for any hypothesis concerning the relationship between performance quality and residual intrinsic motivation decrements. McGraw and McCullers cite as exemplars two results of their own study. First, incentive interfered only with the solution of the final set-breaking problem, even though the initial nine problems

required a more complex solution. Second, this pattern occurred in the absence of a postreward preference decrement. Neither a distraction nor a cognitive-orientation approach explains the selective interference effects due to reward; neither approach explains the lack of correlation between quality and preference measures.

### Summary

Rewards and other external motivational factors can impair subsequent intrinsic motivation. This is especially likely to happen when the external factor is made salient to the subject, and when the target activity is interesting to the subject prior to experimental manipulations. Overjustification effects can be moderated by providing feedback about the source of the subject's motivation, and the subject's competence at the target task. In addition to affecting subsequent task motivation, rewards and other external motivational factors can have immediate effects on the quality of performance, particularly with creative activities and complex problem-solving tasks.

While the extant data are interesting and stimulating, we are far from a comprehensive theoretical understanding of the phenomena. Attributional analyses, because of their ability to explain the operation of different independent variables, provide the most comprehensive account of the diversity of the results in the overjustification literature. Yet the strength of this approach is purchased at the price

of a lack of precision and testability (Bem, 1972; Davidson & Bucher, 1976; Feingold & Mahoney, 1975; Reiss & Sushinsky, 1975, 1976; Ross, 1975). This lack of precision is illustrated, for example, by the ambiguity in predicting the role of reinforcement/incentive effects as antecedents for subsequent overjustification effects. In addition, attributional analyses can easily be misused by well-intentioned investigators, if the mediating theoretical concepts are allowed to free-float, independent of antecedent conditions (Bem, 1972).

While the attributional analyses have definite shortcomings as testable scientific propositions, it is not clear that the alternative hypotheses fare much better in this regard. Williams' (1980) two-factor theory is an explicit attempt to provide a more rigorous and testable account of overjustification effects. The two-factor model states (1) that reward procedures have both excitatory and inhibitory components, and (2) that these opponent processes can be independently manipulated to produce predictable effects on measures of subsequent motivation. The first proposition is a logical necessity, given that rewards do indeed have excitatory and inhibitory effects. The veracity of the second proposition is not self-evident. That is, it is not clearly the case that reward value and behavior constraint are independent components with operationally distinct antecedents. Both components, in fact, refer to controlling or

constraining features of reward procedures. As the reinforcing power of the reward procedure increases, both the components should increase in magnitude. At the present time we have no clear means of predicting the relative growth rates of the two components.

The same criticism concerning precision and testability may also be leveled at the competing-response hypothesis. Reiss and Sushinsky (1976) argue that the occurrence of over-justification effects in the absence of evidence of incompatible behaviors elicited by the reward procedure is not necessarily inconsistent with the competing response hypothesis. If such a pattern emerges, then the experimenter must have measured the wrong competing response, or used a poor measure of that response. This logic suggests that an adequate test of the competing-response hypothesis must include valid measures, direct or indirect, of perceptual and cognitive distraction, frustration, general arousal, and perhaps an unspecified host of other potentially interfering behaviors. Such an experiment is probably beyond the technical expertise of contemporary experimental psychology. Recall that the competing-response hypothesis was initially formulated, in part, to remediate the post-hoc flexibility of attributional analyses.

Finally, it should be noted that a behavioral contrast approach does not provide, at the present time, a theoretical panacea. The contrast-oriented theorists (e.g.,



Davidson & Bucher, 1978; Feingold & Mahoney, 1975; Mawhinney, 1979) have been long on the restatement of metatheoretical assumptions and short on the production of data that bear directly on the relevance of behavioral contrast to overjustification phenomena. As noted previously, overjustification experiments were not designed for this purpose. The evaluation of behavioral contrast propositions within a human social context may prove to be a difficult undertaking. The assumption that there are lawful, cross-specific principles of behavior does not imply that methods used in animal learning laboratories can be transferred wholesale to the context of human social behavior. Such a crossing of areas needs to take into account the variety of external control factors in human behavior and the complexity of response dimensions.

Two additional problems must be addressed if a successful integration of the literatures of behavioral contrast and overjustification occurs. If it can be demonstrated that contrast and overjustification are accounted for by common principles, then the problem still remains of formulating a satisfactory explanation of behavioral contrast phenomena. Assuming that this occurs, it may not be the case that a theory of contrast would be accepted as such by social psychologists, because of divergent metatheoretical assumptions. In the ideal Skinnerian theory, the elements of the theory refer directly to observable events. In

cognitive and social psychology, propositions of that sort are often not acknowledged as theories (e.g., Underwood, 1975).

CHAPTER II  
EXPERIMENT I

As indicated in the literature review, there is little consensus as to why overjustification effects occur. One reason for this state of affairs is that the competing theoretical analyses often make similar predictions for a given set of circumstances. Recall, for example, the consistent finding that the probability of overjustification effects increases as a function of the salience of the reward. This would be predicted by both attributional and nonattributional models of overjustification. The present experiment is designed to provide a test of attribution theory in an overjustification procedure in which the non-attributional approaches make no obvious predictions.

The theories of overjustification can be divided into two sets: those that emphasize the role of discounting as a mediating variable, and theories that focus on the role of incentives in altering treatment-session performance. The latter group of theories have been called performance-mediation accounts (Deci & Ryan, 1980). There is no doubt that both discounting and treatment-session performance differentials can occur in the overjustification paradigm. The problem to be addressed here is the degree to which these effects are necessary antecedents of posttreatment value shifts.

One distinctive feature of the discounting analysis concerns the timing of the mediating attribution. The role of intrinsic motivation for performing a target activity can be discounted either before, during, or after the treatment session. As long as intrinsic motivation is discounted prior to the test session, overjustification effects should occur. Retrospective discounting of intrinsic motivation should occur under any of the following circumstances. First, the individual may acquire information about a plausible external cause which was not known to exist at the time of performance. Second, the individual may be aware of the existence of an external factor, but may assign that factor a causal role only on the basis of information acquired after the termination of performance. Third, the individual may forget about some external factor that was present during performance, and then make a retrospective attribution when reminded of the factor.

Procedures that induce either retrospective discounting or discounting concurrent with performance should both lead to overjustification effects. The difference in the two kinds of procedures would involve salience. One would generally expect that an external factor which leads to concurrent discounting would be more salient than a factor that induces only retrospective discounting.

The performance-mediation models assume that overjustification effects occur because the reward procedure has

altered treatment session performance so as to make the target activity less preferred. These models can only make predictions about external factors (rewards, surveillance, etc.) that are introduced before or during the treatment session. The performance mediation models are summarized below:

(1) Satiation-boredom: The incentive manipulation produces an increase in the frequency or duration of the target activity during the treatment session, relative to unrewarded controls. The rewarded subjects become differentially fatigued with the target activity so that posttreatment performance deficits occur (Calder & Staw, 1975a; Scott, 1976).

(2) Behavioral or incentive contrast: The reward procedure produces reinforcement or incentive effects during the treatment session, which are functionally related to negative contrast effects during extinction. Reinforcement, by definition, changes the distribution of activities that would normally occur in a free-choice setting. The direction and magnitude of posttreatment value shifts can be predicted from the nature of the contingency and its effects during the treatment session (Catania, 1973; Feingold & Mahoney, 1975; Mawhinney, 1979; Fuoco, Note 3).

(3) Qualitative differences: Rewarded and unrewarded performance of some activity may be comparable in terms of gross measures of frequency and duration, yet differ in more molecular aspects. Performance under a reward contingency

can produce a rigidity of cognitive set, a difficulty in changing problem-solving tactics (McGraw & McCullers, 1979). In addition, reward contingencies can induce stereotyped responding, such that there is a reduction in the variability of response sequences (Schwartz, 1982a, 1982b).

(4) Competing responses: The competing-response hypothesis (Reiss & Sushinsky, 1975, 1976) is an omnibus description of performance-mediation effects. Incentive procedures can elicit a variety of responses that are incompatible with full enjoyment of the target activity. These competing responses include excitement in anticipating reward or frustration in having to wait for a reward (Ross, Karniol, & Rothstein, 1976); hurried performance accompanied by poorer quality work (Lepper et al., 1973); and attending to the reward rather than concentrating on the task.

Several theorists (e.g., Deci & Ryan, 1980; Lepper, Sagotsky, Dafoe, & Greene, 1982) have argued that performance-mediation effects are not necessary antecedents of overjustification effects. This argument is based on the fact that several studies (e.g., Deci, Cascio, & Krusell, 1975; Lepper et al., 1982) have obtained overjustification effects while prior performance during the treatment session did not differ among experimental groups. Support of a theoretical position on the basis of the null hypothesis is always open to criticism. The experimenters may have selected insensitive measures of performance, or may have neglected to assess

some critical performance mediators. These criticisms are applicable in the present context for several reasons. First, given the wide range of potential performance mediators, it would be extremely difficult to provide exhaustive measures within a single experiment. Second, some of the proposed performance-mediators (e.g., stereotyped response sequences) require specially designed tasks in order to obtain sensitive measures. Finally, the primary dependent variable in overjustification studies is posttreatment value rather than treatment-session performance, and the assessment procedures reflect this emphasis. This is demonstrated by the fact that many published reports contain no mention of possible treatment-session performance differentials.

There is one published study in which overjustification effects were obtained using a procedure that ruled out the possibility of performance mediators. Kruglanski, Alon, and Lewis (1972) led elementary school children in a number of games. In the reward condition, the subjects were given a prize after participating in the games. The children were led to believe that they had been promised a reward prior to initiating the games, but in fact reward was not mentioned until the games were completed. Children in a control group neither expected nor received any prizes. All subjects answered a posttreatment questionnaire concerning the perceived locus of causality and preference for the games. The rewarded subjects liked the games less than did the control

subjects, and they tended to attribute performance to extrinsic rather than to intrinsic motivation. Kruglanski et al. attributed these results to retrospective discounting. Performance-mediation explanations were ruled out because the groups were treated identically before and during the treatment session.

The major purpose of the present study was to provide another test of a discounting interpretation of overjustification effects. As in the Kruglanski et al. (1972) experiment, performance-mediation explanations were ruled out by the use of a retrospective misattribution procedure. This was done with a bogus subliminal perception manipulation. Subjects performed a target activity while listening to a taped selection of background music. At the end of the performance session, subjects were told that the music contained subliminal messages encouraging them to perform and to enjoy the target activity. To the extent that subjects attribute performance to the subception procedure, intrinsic motivation should be discounted, and the value of the target activity should be reduced in a subsequent free-choice assessment period. As in the Kruglanski et al. (1972) experiment, control and experimental subjects were treated in the same way before and during the treatment session.

Some additional factors were investigated in the present study. If an external facilitative "cause" induces a discounting of intrinsic motivation, then performing an activity



in the presence of an inhibitory "cause" should lead to an increase in perceived intrinsic motivation. This is called the augmenting principle, and is considered to be a corollary of the discounting principle (Kelley, 1973). Some subjects were told that the subliminal messages discouraged performance of and enjoyment of the target activity. Subjects in these circumstances should make a strong internal attribution, given that they performed the target activity even though external conditions discouraged performance. This augmenting of perceived intrinsic motivation should lead to high target activity value during the posttreatment performance assessment.

In order to make the subception manipulation more credible, a second independent variable was included. During the initial performance session, subjects had their galvanic skin response (GSR) assessed. After the end of the treatment session, some subjects were given false feedback as to the physiological measure of preference. In the Ineffective Feedback conditions, subjects were told that the subliminal messages had no effect on GSR, i.e., that the GSR readings indicated no specific preference for the target activity. In the Effective Feedback conditions, subjects were informed that the subliminal messages influenced GSR output. If the subliminal messages encouraged target activity performance, then the GSR indicated a strong preference for the target activity. If the subception procedure

discouraged performance, then the GSR indicated a low preference for the target activity. In a third condition, no GSR feedback was given.

In summary, the independent variables were Subliminal Message (Encourage or Discourage) and GSR Feedback (Ineffective, Effective, or No Feedback). A control group received no information about either subliminal perception or GSR feedback. The primary dependent measure was preference for the target activity in a subsequent free choice setting. Attribution theory would predict an interaction between the content of the subliminal message and the GSR feedback. In the Effective Feedback conditions, subjects were explicitly told that the subception procedure had influenced preference, which should induce external attributions. This should produce an augmenting of perceived intrinsic motivation in the Discourage condition, and a discounting of intrinsic motivation in the Encourage group. Thus, posttreatment target activity value should be higher in the Discourage-Effective group than in the Encourage-Effective group. In the Ineffective feedback conditions, subjects are told that the subliminal messages exercised no functional control over responding. These subjects should not make external attributions, and there should be no significant differences in target activity value between the Encourage-Ineffective and Discourage-Ineffective groups. For the No Feedback conditions, the posttreatment preference for the target activity

should depend on the subjects' inferences of causality. If the subjects assume that the subliminal messages exercised control over responding, then discounting and augmenting effects should occur as in the Effective Feedback conditions.

It should be emphasized that the present study is not a test of the performance-mediation hypotheses of overjustification effects. Those hypotheses make no clear-cut predictions about value shifts under these conditions. Rather, the purpose is to provide a test of the attributional analysis in a situation that is "uncontaminated" by performance-mediation effects.

### Method

#### Subjects

The subjects were 70 women recruited from undergraduate psychology courses at the University of North Carolina at Greensboro. They ranged in age from 18 to 48 years. The students received course credit for participating in the study. The subjects were randomly assigned to the seven conditions, with the stipulation that each condition would have an equal number of subjects.

#### Experimental Design and Dependent Measures

A 2 x 3 x 2 mixed between- and within-subjects design was used. The between-subjects factors were Subliminal Message (Encourage or Discourage) and GSR Feedback (Effective, Ineffective, or No Feedback). The within-subjects factor

was Sessions (1 and 2). A control condition, not contained in the factorial, received no information about either the subliminal suggestion or the GSR recordings.

Dependent variables included performance measures from Sessions 1 and 2, and questionnaire responses taken at the end of Session 2. An interval-sampling procedure was used for the performance measures: each 8-minute session was divided into 32 15-second intervals. The experimenter recorded whether the subject performed each of the three experimental activities for each interval. (See Appendix A, Data Sheet.) The postexperimental questionnaire contained items pertaining to intrinsic motivation for the experimental activities, credibility checks, and some filler items. (See Appendix B, Questionnaire.)

### Apparatus

The experimental activities were chosen because of their interest to adults and because similar or identical items have been used as target activities in published overjustification studies. The activities were "Labyrinth," a maze game; "Space Probe," a game in which two steel rods are manipulated so that a ball balanced upon them falls into numbered holes; and "Encore," an electronic display of eight lights in which the player matches increasingly complex sequences of lights.

The GSR machine was a Fels Dermohmeter, Model 22A, Yellow Springs Instrument Co.

### Procedure

Each subject was run individually by a male graduate student. The experimenter explained that the purpose of the study was to assess verbal and physiological preference for certain activities. (See Appendix C, Instructions, Experiment I.) The subject was told that she would be asked to sample some interesting activities, during which time GSR measures would be recorded. Following this procedure, the subject would be asked to complete a questionnaire concerning her opinion of the activities. Prior to beginning Session 1, each subject signed a consent form acknowledging voluntary participation.

The experimenter briefly demonstrated the use of the three experimental activities, then attached the GSR electrodes to the subject's left wrist. The subject was then asked to freely sample the activities for the following 8 minutes, with the stipulation that each activity should be tried at least once. At this point the experimenter switched on a recording of instrumental music. For the next 8 minutes the experimenter sat across the room, out of the subject's direct view, presumably monitoring the GSR equipment. Actually the experimenter was recording the subject's choice of activities.

At the end of 8 minutes, the experimenter switched off the music, removed the GSR electrodes, and began the false debriefing procedure for subjects in the experimental

conditions. The experimenter briefly explained the nature of subliminal suggestion, and told the subject that the recorded music contained verbal messages designed to influence preference for the target activity. In the Encourage conditions, the messages consisted of exhortations to play with and to enjoy the target activity. In the Discourage conditions, the messages informed the subject that the target activity was unenjoyable and should be avoided. In order to lend credibility to the manipulation, the experimenter played a demonstration tape in which the subliminal messages were "enhanced" so that they were clearly audible (see Appendix C).

In all conditions the target activity was designated as the individual subject's second most preferred activity during Session 1.

Following the demonstration of the hidden messages, subjects in the feedback conditions were given information about the effects of the subliminal messages on their GSR measures. In the Ineffective feedback conditions, subjects were told that the subliminal suggestions had no influence on GSR. Subjects in the Effective feedback conditions were told that there was either a marked increase or decrease in GSR during performance of the target activity, in accord with the content of the subliminal messages.

Subjects in the Control condition were told nothing about the target activity, subliminal messages, or the outcome of the GSR recordings.

At this point the experimenter excused himself to get the questionnaire and to "check on another person working on another experiment." The subject was asked to wait in the laboratory, and told to feel free to sample the experimental activities during the interim if she so desired. For the next 8 minutes the experimenter recorded the subject's choice of activities from an adjacent room through a one-way mirror. At the end of Session 2, the experimenter returned with the questionnaire. After completing the questionnaire, the subject was thanked and debriefed.

### Results and Discussion

Three subjects initiated the experiment but were excused before completing Session 2; their data are not included in any analyses. Two of the subjects failed to sample all three activities during Session 1 as requested, so they were excused at the end of Session 1. The third subject was excused during Session 2 because of a disturbance in an adjacent laboratory room. Three additional subjects were run so that there were 10 in each condition.

### Verbal Data

Several of the items on the questionnaire dealt with the subjects' recall of experimental manipulations.<sup>5</sup> Two items (Q4a, Q8a) asked if the music contained subliminal messages. Eighty-eight percent of subjects in the experimental groups answered "Yes" to these items. The remainder,

when individually questioned, recalled being informed about the subliminal message, but answered the items in the negative because they hadn't heard the messages during Session 1. All of the subjects who reported that the music contained subliminal messages correctly recalled the content of the messages (Q4b). When asked about GSR feedback (Q6), 97% of the subjects in the experimental conditions correctly reported whether feedback was given, and the content of the feedback when it was administered.

Three questionnaire items provided a check on the credibility of the GSR feedback and subliminal message manipulations. One question (Q7) asked if the subjects felt that the GSR was an accurate measure of attitudes towards the experimental activities. On a scale of 1 to 9, with 1 indicating an extremely invalid and 9 an extremely valid measure, subjects in the feedback conditions had a mean rating of 6.17. This suggests that the GSR feedback manipulation was somewhat credible. There were no significant differences among the four feedback groups on this question.

Item 8b asked the subjects to report the extent to which they believed that the subliminal messages affected their attitudes towards the experimental activities. The mean responses on this item are shown in Table 2. In the Effective Feedback conditions, subjects said that the subliminal messages had a substantial effect on attitudes ( $M = 5.00$ ) while subjects in the Ineffective Feedback groups reported



little effect from the subliminal messages ( $M = 1.47$ ). The mean for the No Feedback conditions fell between those of the Effective and Ineffective Feedback groups ( $M = 3.15$ ). This main effect for GSR feedback was significant at the .01 level (see Table 3 for a summary of the analysis. The main effect for Subliminal and the interaction were not significant. These data provide further support for the credibility of the GSR Feedback procedure.

Q5 asked the subjects to estimate the time spent on the target activity during Session 1. The mean percentage estimates are shown in Table 4, and a summary of the statistical analysis in Table 5. Both main effects and the interaction were statistically significant. Post-hoc analyses<sup>6</sup> indicate that, in the Encourage-Effective condition, subjects estimated a higher proportion of time spent on the target activity, relative to estimates in the Encourage-No Feedback and Discourage-Effective conditions. There were only slight differences among the three Discourage conditions. None of the experimental group means were significantly different from the control mean, although there was a trend ( $p < .10$ ) towards higher estimates in the Encourage-Effective condition. These results suggest that subjects in the Encourage-Effective group believed that the subliminal message effectively induced them to perform the target activity during Session 1. The lack of a complementary effect in the Discourage-Effective condition may be due to the fact that all of the experimental

activities were fairly interesting. It may have been difficult for subjects in the Discourage conditions to believe that the subliminal suggestions could significantly disrupt enjoyment of an interesting target activity.

One question (Q12) was intended as a check on the successful selection of three interesting experimental activities. Subjects were asked if they found the activities, on the whole, to be interesting. On a scale of 1-9, with 9 being extremely interesting, the mean rating across groups was 7.67. This finding supports the notion that the three activities were fairly interesting. There were no differences among the conditions on this item.

Two questions of special interest were Q1 and Q9, which asked the subjects to rate the target activity in terms of "enjoyment" and "interest," respectively. Each subject's responses on these two items were summed to obtain a verbal measure of value. The means are shown in Table 6, and a summary of the analysis in Table 7. The main effect for Subliminal was significant at the .05 level, with Encourage ( $M = 12.53$ ) being higher than Discourage ( $M = 10.03$ ). This is a compliance effect; subjects who received "subliminal" suggestions to enjoy the target activity rated the activity higher than did subjects who were instructed to dislike the activity. The main effect for GSR Feedback was also significant ( $p < .01$ ). Post-hoc analyses indicate that the mean rating for the No-Feedback conditions (9.65) was significantly

lower than the mean of the Effective Feedback conditions (12.20). The Dunetts test indicated lower values for the two No-Feedback conditions, and for the Augment-Effective condition, relative to the control group. The Subliminal x GSR Feedback interaction was not significant. The reason for the low values in the No-Feedback conditions is not clear.

One final question (Q13) was an attempt to assess the subjects' locus of causality for performing the target activity. In this item the subjects were asked, on a 1-9 continuum, whether they performed the target activity primarily because it was enjoyable, or for "other reasons." There were no significant differences among the groups on this item. See Tables 8 and 9.

#### Performance Data

The primary dependent variable in this experiment is the amount of play with the target activity during the post-treatment test session. This measure is assumed to be the most valid measure of value, because pains were taken to ensure that the subjects were unaware of being observed. The verbal measures of value, on the other hand, may have been more easily influenced by demand characteristics, since the subjects could easily deduce that the questionnaires would be evaluated.

Table 10 shows the mean number of intervals in which subjects performed the target activity during Session 2.

The analysis of those data is summarized in Table 11. The main effect for Subliminal was significant at the .05 level, with Encourage producing higher values ( $M = 9.20$ ) than Discourage ( $M = 4.43$ ). Neither the main effect for GSR Feedback nor the interaction were statistically significant. The Dunnetts test indicates that none of the experimental conditions were significantly different from the control group. These results indicate a compliance effect: when the "subliminal message" encouraged subjects to perform the target activity, target activity value was higher than in the Discourage conditions, where performance of the target activity was discouraged.

An additional analysis was conducted in order to determine whether the differences in target activity value were specific to the target activity or were a function of differences in performance of all the experimental activities. Table 12 shows the means for total intervals in which subjects performed any of the three activities during Session 2. As shown in Table 13, there were no significant differences among the experimental groups, which indicates that general performance increments or decrements cannot account for the target activity value data.

Finally, a series of three analyses were performed to check for any pretreatment differences among groups. A one-way ANOVA, with seven levels, was run on the number of intervals in which subjects performed the experimental

activities during Session 1. A separate analysis was run for each activity. There were no significant differences in any of the analyses (all  $F$ 's  $< 1.00$ ).

The results of Experiment I indicate that subjects tended to comply with the content of the subliminal messages. The absence of an interaction between GSR Feedback and Subliminal Message is inconsistent with a discounting hypothesis. It was predicted that, especially in the Effective GSR conditions, subjects would infer that target activity performance was controlled, at least in part, by the subliminal message. These external attributions should have been accompanied by either discounting or augmenting of perceived intrinsic motivation, which should have been reflected in posttreatment target activity performance. One possible explanation for the failure to obtain an interaction is that the independent variables were simply ineffective in influencing perceptions of causality. The questionnaire data do not support this hypothesis. Recall that subjects reported that the "subliminal message" had at least a moderate influence on attitudes in the Effective GSR conditions, significantly higher than the degree of influence reported by subjects in the Ineffective GSR conditions. Subjects also estimated that performance of the target activity during Session 1 was consistent with the sanctions of the subliminal message.

CHAPTER III  
EXPERIMENT II

A second experiment was designed to provide another means of manipulating the subjects' perceptions of causality. Both cognitive evaluation theory (Deci, 1975; Deci & Ryan, 1981) and reactance theory (Brehm, 1966; Wicklund, 1974) suggest that a demonstration of functional external constraint is not a necessary antecedent of oppositional or countercontrol behavior. Rather, it is sufficient that free performance only be threatened. If subjects perceive an attempt to control performance of the target activity, they should respond by altering the value of the activity in the opposite direction of the constraint attempt. In Experiment II, the salience of constraint was manipulated by different instructions describing the purpose of the subliminal stimulation. In the High Salience conditions, subjects were told that subception is a brainwashing technique, typically used for mind control. In the Low Salience conditions, subception was described as a test of sensitivity to subtle auditory stimuli. Assuming that a salient attempt at constraint is sufficient to produce overjustification effects, then oppositional behavior should occur in the High Salience procedure. On the basis of Experiment I, it was predicted that compliance effects would occur in the Low Salience conditions.

### Method

Experiment II differed from Experiment I in that different means were used to manipulate the salience of control. In Experiment II, the subliminal suggestion procedure was described to the subjects as either a mind-control technique or as a test of sensitivity to subtle auditory stimuli. The equipment, location, activities, experimenter, and dependent measures were the same in both experiments.

### Subjects

The subjects were 45 women recruited from undergraduate psychology courses at the University of North Carolina at Greensboro. They ranged in age from 18 to 50 years. All but seven of the subjects received some form of course credit for participating in the study. The subjects were randomly assigned to the five conditions, with the stipulation that each condition would have an equal number of subjects.

### Procedure

Sessions 1 and 2 were conducted in the same way as in Experiment I. At the end of Session 1, half of the experimental subjects were told that they had been exposed to the Encourage subliminal messages, while the remainder were told that they had heard Discourage messages. The Subliminal message variable was crossed with a Salience factor (High or Low). In the High salience conditions, the subliminal

suggestion procedure was presented as a mind-control technique. This communication contained a number of words designed to enhance the controlling aspect of subliminal persuasion, such as "commands," "coerce," "force," and "brainwashing." (See Appendix D, Instructions, Experiment II ) In the Low salience conditions, the subliminal suggestion procedure was described as a test of sensitivity to subtle cues. None of the participants received any GSR feedback. The procedures for the control condition were the same as in Experiment I.

### Results and Discussion

Four subjects initiated the experiment but were excused before beginning Session 2; their data are not included in any analyses. Two of the subjects failed to sample all three activities during Session 1 as requested, and two quit performing the activities during Session 1. Four additional subjects were run so that there were nine in each condition.

#### Verbal Data

Two of the questionnaire items (Q4a, Q8a) asked if the music contained subliminal messages. The percentage of subjects in the experimental groups who responded in the affirmative was 77.5%. Of those subjects who acknowledged that the music contained hidden messages, 87% correctly reported the content of the messages (Q4b).

Two questionnaire items were designed to determine if the subjects believed that attitudes or performance had been



affected by the subception procedure. On one item (Q8b), subjects reported the extent to which they believed that the subliminal messages affected their attitudes towards the experimental activities. The mean responses to this item are shown in Table 14. There were no significant differences among the experimental groups (Table 15). The overall mean response on this item ( $M = 2.78$ ) was comparable to the mean response on the same item for the No Feedback conditions ( $M = 3.15$ ) in Experiment I.

On Q5, subjects were asked to estimate the time spent on the target activity during Session 1. The mean percentage estimates are shown in Table 16. There were no significant differences among groups on this item (Table 17).

Item 12, which asked the subjects to rate the experimental activities as a whole, was included as a check on the intrinsic interest of the activities. The mean rating, across all conditions, was 7.67 on a 1-9 scale. This was the same mean rating obtained in Experiment I, again indicating that the activities were interesting. There were no differences among conditions on this item.

Questions 1 and 9 asked the subjects to rate the target activity in terms of "enjoyment" and "interest," respectively. Each subject's responses to these items were summed to obtain a verbal measure of value. The means are shown in Table 18. There were no significant differences among groups (Table 19).

One final question (Q13) was included to assess the perceived locus of causality for performing the target activity. Subjects were asked, on a 1-9 scale, whether they performed the target activity because it was enjoyable, or for "other reasons." Mean ratings are shown in Table 20, and a summary of the analysis in Table 21. There were no significant differences on this item.

#### Performance Data

The performance measures of target activity value were consistent with the predictions. The mean number of intervals in which subjects performed the target activity during Session 2 are shown in Table 22. Neither main effect was significant, but the interaction was significant at the  $p < .01$  level (see Table 23). In the Low Salience conditions the subjects tended to comply with the content of the "subliminal message" with a mean of 15.78 for the Encourage condition, and a mean of 4.56 in the Discourage group. A reversal of this pattern occurred when the salience of constraint was High, with a mean of 3.67 for Encourage and a mean of 8.33 for Discourage. Post-hoc tests indicate that value was significantly higher ( $p < .05$ ) in the Encourage-Low group, as compared with the Encourage-High and Discourage-Low conditions. The mean of the Encourage-High condition was also significantly higher ( $p < .05$ ) than that of the Control group ( $M = 5.22$ ).

The total intervals in which any of the three activities were performed during Session 2 were analyzed to determine if the previous results were specific to the target activity. The means are shown in Table 24, and a summary of the analysis in Table 25. While neither the main effects nor the interaction were statistically significant, the Subliminal x Salience interaction approached significance ( $F = 3.38, p < .10$ ). The pattern of total activity performance is very similar to the pattern found with target activity performance. Total performance is higher in the Encourage-Low group than in the Discourage-Low group, while the order is reversed for the High Salience conditions.

Finally, the possibility of pretreatment differences was assessed by analyzing the performance of each activity during Session 1. Three separate one-way ANOVA's were run, with the results indicating no significant differences (all  $F$ 's  $< 1.15$ ).

The results of Experiment II support the prediction that compliance effects should occur when the salience of constraint is low, while oppositional behavior should occur when the salience of constraint is high. This finding is consistent with both reactance theory (Brehm, 1966) and cognitive evaluation theory (Deci & Ryan, 1981), which suggest that the perception of an attempt to control or constrain should be sufficient to produce oppositional behavior. It is possible that attempts at constraint will produce

oppositional behavior, even if the person does not believe that functional control was exercised. Indeed, the questionnaire data provide no support for the idea that any of the experimental groups believed their behavior to be under the control of the subception procedure. The verbal data provided no indication that subjects perceived that either their Session 1 performance or their attitudes were affected by the subliminal messages. While the role of functional control, as investigated in Experiment I, is unclear, Experiment II suggests that attempted control is a critical variable in producing compliance or countercompliance.

There is another possible interpretation of the results obtained thus far. Experiment II contains a conceptual confound. While the salience manipulation was designed as a way of manipulating the controlling aspect of the subception procedure, it is also possible that the affective context of subception was different in the two salience conditions. It is reasonable to assume that being subjected to a "mind-control" procedure is more aversive than participating in a test of sensitivity to subtle auditory stimuli. If this is the case, then the counter-compliance effects obtained in the High Salience conditions may have been due to the aversive connotations of the subception procedure rather than the salience of constraint per se.

This interpretation is consistent with Heider's (1958) cognitive balance theory of interpersonal relationships.

Balance theory, like other consistency theories, assumes that people are motivated to maintain harmony among related cognitions or beliefs. Consistency theories were developed in an attempt to identify a general construct of human motivation in reaction to the inadequacies of drive-reduction. The brief discussion of balance theory that follows will focus on (1) the ways in which beliefs or cognitive elements may be related, (2) balanced and imbalanced relationships, and (3) means of reducing imbalance.

According to balance theory, cognitive elements can be linked either by a unit relationship or a sentiment relationship. The concept of unit relationship is derived from Gestalt and field theories. Unit relationships are often a function of temporal or spatial contiguity. Thus, perceptions about a man and his wife may be related because the pair are often seen together. In the same way, perceptions about Liberace and piano music may be related. Sentiment relationships take the form of liking or disliking. Attitudes towards Ronald Reagan and defense spending are related because Reagan endorses military spending. Opinions about abortion and attitudes about the Pope are related because the Pope publicly disapproves of abortion.

It is important to note that strictly logical relationships between ideas or attitudes are not sufficient to produce balanced or imbalanced relationships. Many Americans believe that freedom of speech is an inalienable right

of all Americans, and that American Communists should not be allowed the right of free speech. These two beliefs are logically inconsistent. However, psychological inconsistency or imbalance will occur only if these beliefs are linked in some way. Imbalance would occur, for example, if the logical inconsistency was specifically pointed out to the individual.

Balanced triads among sentiment relationships occur when there are three positive relationships or two negative relationships. An example of the first case would be: Jack likes Ronald Reagan, Jack likes the idea of increased defense spending, and Reagan endorses increased defense spending. In this situation there is no stress for Jack to change his opinions about either Reagan or defense spending. Examples of the double-negative balanced triad are as follows: (1) Jack dislikes Reagan and increased spending, while Reagan endorses defense spending. (2) Jack dislikes the Pope, the Pope dislikes abortion, and Jack endorses abortion. Again, there is no stress towards attitude change.

Imbalance occurs when there is a single negative evaluation among three sentiment relationships. For example, if Jack likes Reagan, and Reagan endorses defense spending, and Jack dislikes military expenditure, then an imbalanced triad exists. Similarly, imbalance would occur if Jack dislikes Reagan, Reagan endorses defense spending, and Jack endorses military spending. In both of these situations,

imbalance can be redressed by escape or avoidance, compartmentalization, altering perceptions of others' sentiment relationships, or altering one's own sentiments.

Escape or avoidance may be the simplest way to reduce the aversive consequences of imbalance. With regard to the previous example, Jack can quit thinking about Reagan and the defense budget; he can quit having lunch with friends who enjoy discussing politics; he can avoid reading the newspaper. A second tactic is compartmentalization: Jack can divorce his feelings about Reagan from his feelings about defense spending. Reagan's primary job is to promote the health of the domestic economy, which bears little relationship to the President's role as Commander-in-Chief. Thus, Reagan's good or bad qualities vis-à-vis his principal role are unrelated to defense spending. A third way for Jack to reduce imbalance is to alter beliefs about Reagan's evaluation of defense spending. Reagan would really like to reduce military expenditures, but he is temporarily obligated to endorse defense spending as a means of facilitating party unity. Finally, Jack can alter his evaluations about either defense spending or Reagan, or both, to achieve greater balance.

Balance theory makes no firm a priori predictions concerning individual means of redressing imbalance, other than suggesting that the easiest or least costly method is most likely. Predictions within a particular situation, then,

must take into account the ease of avoiding conflict, the intensity and importance of particular sentiments to the individual, and so forth. In the typical laboratory investigation, the experimenter attempts to induce inconsistency while deliberately restricting the available means of inconsistency reduction. Following our example, the experimenter might first assess subjects' evaluations of Reagan and then expose subjects to a communication from Reagan. The communication might concern Reagan's evaluation of the Irish Setter postage stamp. If an imbalance exists among the subject-Reagan-stamp triad, the experimenter might reasonably predict that attitudes toward the stamp would change. Escape is unlikely since the subject is usually committed to remaining in the setting for the duration of the experiment. The possibility of altering perceptions about Reagan's evaluation of the stamp could be minimized by using a communication from Reagan that is unequivocally either positive or negative towards the stamp. Compartmentalization has been empirically shown to be a rare means of reducing imbalance (Jordan, 1953). Assuming that sentiments towards Reagan are more intense (less easily changed) than are attitudes about stamp designs, then changing attitudes about the stamp is the most probable means of achieving balance.

Balance theory can be used to interpret the results of both Experiments I and II if several assumptions are made. First, one must assume that there is a relationship between



the subjects' attitudes towards subception and attitudes toward the target activity. This is justified by the fact that the two are linked by the positive or negative sanctions of the activity contained in the subliminal messages. Second, it is necessary to assume that the descriptions of subception and its typical uses resulted in either positive or negative evaluations of subception. In the High Salience conditions, Experiment II, subception was described as being used by unpleasant people for selfish ends, so that subception should be negatively evaluated. In all other experimental conditions in the two studies, subception was not presented in a negative context. Given that the experimenter was a respected authority figure, and that his use of subception implied endorsement of the procedure, then subception should have been positively evaluated. The third assumption necessary for a balance interpretation is that any imbalance is likely to be redressed by changes in the value of the target activity. The other means of reducing imbalance are more costly or implausible. Escape from the situation is difficult since the subjects are committed to remaining in the experiment. Compartmentalization, as noted earlier, is infrequently used to achieve balance. Altering perceptions about the subliminal sanctions towards the activity would be difficult, since the subliminal messages are explicit and unambiguous in discouraging or encouraging target activity performance. Finally, altering the value of the target

activity involves little cost; no obvious standards or mores are threatened by doing so.

If subception is positively evaluated, and subception endorses the target activity, then balance theory predicts a tendency towards increments in target activity value. This is a case of the triad in which balance is achieved by maintaining three positive sentiment relationships. If subception is positively evaluated and subception discourages target activity play, then balance is achieved by devaluing the activity. This is the triad in which balance is maintained by having two negative and one positive sentiment relationships. Thus, balance theory predicts that, when subception is positively evaluated, target activity value should shift towards compliance with the subliminal messages. This interpretation is consistent with the finding that compliance effects occurred in Experiment I and in the Low Salience conditions of Experiment II, in which subception is assumed to be positively evaluated.

When subception is negatively evaluated, as is assumed for the High Salience conditions of the second study, balance can be achieved by having one and only one other negative sentiment relationship. If the subliminal message is negative towards the target activity, then the subjects' evaluation of the target activity should shift towards the positive. Conversely, if subception endorses the activity, then the activity should become more negatively evaluated.

This would explain the finding that countercompliant evaluation of the target activity occurred in the High Salience conditions.

CHAPTER IV  
EXPERIMENT III

Experiment III was designed to test a balance theory interpretation of Experiments I and II. This was done by manipulating the affective context of the subception procedure while maintaining the salience of constraint as a constant. As in the High Salience conditions, Experiment II, all subjects were told that subliminal perception was a mind-control technique. In addition, they were told that previous research has clearly demonstrated that subception procedures have powerful control over attitudes and behavior. In the Positive conditions, an attempt was made to imbed this control technique within a positive affective context, such that the subjects would have a positive attitude towards subception. Subception was described as being typically used by psychologists for therapeutic purposes, to help people quit smoking, to build self-esteem, and the like. In the Negative conditions, subjects were told that subception was used by Communists as a means of brainwashing children, by cult members to corrupt American youth, and so forth. Cognitive balance theory would predict that compliance should occur in the Positive conditions, and oppositional behavior in the Negative conditions.

Reactance theory (Brehm, 1966) can be used to derive different predictions. According to reactance theory, the occurrence of oppositional behavior is a function of the degree of constraint or threat of constraint. The source of constraint, whether positively or negatively evaluated, is not critical to the degree of reactance arousal. Thus, reactance theory would predict that oppositional behavior would occur in both the Positive and Negative contexts.

Before describing the procedures of Experiment III, a comment on the relationship of affect and constraint is appropriate. This study attempts to vary affective context while holding the degree of attempted constraint constant. In fact, it is probably impossible to completely separate affect and constraint. Malicious agents of social influence may be perceived as more controlling than benign agents, regardless of experimental manipulations. Nonetheless, acknowledging that a factorial separation of constraint and affect is difficult, Experiment III is presented as an approximation of that goal.

#### Method

Experiment III differed from the previous experiments (I and II) in that no attempt was made to manipulate salience of control as an independent variable. Rather, an effort was made to produce a high perception of attempted control in all experimental conditions, as was the case with the

High Salience conditions in Experiment II. In the present study, subliminal perception was described as being either typically used for benign or therapeutic purposes (Positive Context), or typically used for socially undesirable purposes (Negative Context). The equipment, location, activities, experimenter, and dependent measures were the same as those reported in the previous studies.

### Subjects

The subjects were 75 women recruited from introductory psychology courses at the University of North Carolina at Greensboro. They ranged in age from 17 to 48 years. All of the students received course credit for participating in the study. The subjects were randomly assigned to the five conditions, with the stipulation that each condition would have an equal number of subjects.

### Procedure

Sessions 1 and 2 were conducted in the same way as in Experiments I and II. At the end of Session 1, half of the experimental subjects were told that they had been exposed to the Encourage subliminal messages, while the remainder were told that they had heard Discourage messages. All the subjects were told that subliminal perception is a very powerful means of producing attitude change. (See Appendix E, Instructions, Experiment III.) The Subliminal message variable was crossed with the Affective Context factor

(Positive or Negative). In the Positive Context, subjects were told that benign psychologists typically use subliminal perception for the benefit of the recipients. In the Negative Context, subliminal persuasion was described as a means of producing socially undesirable effects for the selfish gain of the communicator. None of the participants received any GSR feedback. The procedures for the control condition were the same as in Experiments I and II.

### Results and Discussion

Three subjects were deleted from the data analysis. Two of the subjects failed to sample all three activities during Session 1 as requested. The experimenter made a procedural error while running the third subject. Three additional subjects were run so that there were 15 in each condition.

#### Verbal Data

Two of the questionnaire items (Q4a, Q8a) asked if the music contained subliminal messages. Eighty-five percent of the subjects in the experimental groups answered "Yes" to these items. Ninety-four percent of those subjects correctly recalled the content of the "subliminal" message.

One questionnaire item (Q8b) asked the subjects to report the extent to which the subliminal messages affected their attitudes towards the experimental activities. The mean responses to this item are shown in Table 26. There were no

significant differences among the experimental groups (Table 27). The overall mean response for all experimental groups was 3.64, only slightly higher than the overall mean for Experiment II (2.78) and the No Feedback mean in Experiment I (3.15).

On Q5 subjects were asked to estimate the amount of time spent on the target activity during Session 1. The mean percentage estimates are shown in Table 28. As seen in Table 29, there were no significant differences on this item, although the Subliminal x Affect interaction approached significance ( $p < .10$ ). There is a trend such that subjects in the Positive context acknowledged that their performance was consistent with the content of the subliminal message, while the estimates in the Negative conditions were very similar to the Control group estimates.

Another question (Q12) was included as a check on the interest value of the experimental activities. The mean rating, across all conditions, was 7.44 on a 1-9 scale. This was comparable to the mean ratings obtained in the two previous studies, again indicating that the activities were interesting. There were no significant differences on this item.

As in the previous experiments, questionnaire ratings for "enjoyment" and "interest" in the target activity were summed to obtain a verbal measure of value (Q1 + Q9). The means are shown in Table 30 and a summary of the analysis in



Table 31. While neither main effect was significant, the Subliminal x Affect interaction was significant at  $p < .05$ . Post-hoc analyses yield no significant differences among experimental conditions, nor between the Control group and any experimental condition. Inspection of the means reveals a trend towards compliance in the Positive conditions, and a trend towards countercompliance in the Negative conditions.

Q13 asked the subjects about locus of causality for performing the target activity on a 1 ("enjoyable") to 9 ("other reasons") scale. Mean ratings on this item are shown in Table 32. As can be seen in Table 33, the Subliminal x Affect interaction is statistically significant ( $p < .05$ ). Post-hoc tests reveal no significant cell-to-cell comparisons, either within experimental conditions or between experimental conditions and the Control group. In the Positive conditions, the Encourage group performance was attributable to the "enjoyment" of the target activity, while the Discourage group ratings shifted towards "other reasons" as the motivating factor. This pattern was reversed in the Negative conditions. A comparison of these means with the figures in Table 30, the verbal ratings of value, indicates a very similar pattern of responding. The most parsimonious explanation is that both sets of items assessed the same variable-- the extent to which subjects enjoyed the target activity.

### Performance Data

The primary dependent measure, the number of intervals in which subjects performed the target activity during Session 2, is summarized in Tables 34 and 35. While neither main effect was significant, the Subliminal x Affect manipulation was significant ( $p < .025$ ). Post-hoc analyses yielded no significant cell-to-cell comparisons, either within the experimental conditions or between the Control group and any experimental conditions. The pattern of the interaction, however, is consistent with predictions derived from cognitive balance theory. In the Positive conditions, subjects tended to comply with the sanctions of the "subliminal message." Countercompliance effects are seen in the Negative conditions. This interaction occurred even though subjects in all experimental groups were told that subception was a powerful means of controlling attitudes and behavior. Reactance theory, which would predict countercompliance in both the Positive and Negative contexts, was not supported. As stated previously, this reactance theory prediction rests on the assumption that evaluative factors can be varied independent of threatened constraint.

As in the previous studies, an analysis was run on the total intervals in which any of the target activities were performed during Session 2 (see Tables 36 and 37). There were no significant differences, indicating that the effects of the independent variables were specific to the target activities.

The possibility of pretreatment differences was checked by analyzing the performance of each experimental activity during Session 1. Three separate ANOVA's were calculated, with no indications of baseline differences (all  $F$ 's  $< 1.40$ ).

CHAPTER V  
GENERAL DISCUSSION

There were three purposes for conducting the initial study in this investigation: (1) to determine if target activity value change could occur in an overjustification paradigm when performance-mediation effects were ruled out methodologically, (2) to determine if an inhibitory extrinsic "cause" would have opposite and complementary effects relative to a facilitating "cause," and (3) to investigate the role of control or constraint in an overjustification paradigm.

The present experiments clearly indicate that value change can occur in an overjustification procedure in the absence of performance-mediation effects. In each of the three studies the subception manipulation affected post-treatment performance. It could be argued, of course, that performance-mediated effects did occur, and were functionally related to the value shifts. Delayed performance effects (distraction, hurried performance, perseveration of response sequencing, etc.) could have differentially affected performance in the second session of the experiments. This criticism, however, is unavoidable, since the test for value shifts involves performing the target activities.

In terms of the second issue, it is fairly clear that the introduction of an inhibitory cause (the Discourage

subliminal message) had a complementary effect on value with respect to the facilitating cause (the Encourage subliminal procedure). In both Experiments II and III, when the Encourage procedure produced value increments relative to the controls, the Discourage procedure produced value decrements relative to the controls. Similarly, when the Encourage procedure produced value decrements, the Discourage procedure led to value increments. While some of the pairwise cell comparisons described above were not statistically significant in post-hoc tests, the pattern of the results is consistent in both studies.

Another paper reporting augmenting effects was recently published by Wilson and Lassiter (1982). In two studies, free access to an activity was restricted, followed by a test session in which the target activity was freely available. In the first study, preschoolers were restricted from playing with a certain toy. Posttreatment free-play performance of the target activity was greater for these children relative to a control group that had not been constrained. In a second experiment, college students were administered a trivia quiz under conditions which provided ample opportunity to cheat. One group was given a severe warning against cheating, another group received a mild warning, and a control group was not warned at all. In a posttreatment test session, cheating increased as a linear function of severity of threat.

There are two differences between the augmenting effects found in the present studies and the results of Wilson and Lassiter. First, the constraint procedure in Wilson and Lassiter's first study actually restricted free access; children were prevented from playing with the target toy. In the present studies, any perception of constraint was a misattribution, in that there were indeed no subliminal messages. The present investigation thus indicates that actual constraint is not a necessary precondition for augmenting effects. A second difference is that, in the present studies, the target activities were selected to be attractive, while Wilson and Lassiter deliberately selected unattractive target activities. While Wilson and Lassiter did not state that low initial value is a necessary antecedent of augmenting effects, they strongly suggested that low value is a critical factor. The present experiments indicate that this is not the case.

The third purpose of this series of studies was to investigate the role of the retrospective misattribution of constraint in value shifts. Experiment I provided no support for the prediction that perceived control would generate choice shifts in opposition to the direction of control. Even when given explicit information that functional control had occurred (Effective GSR feedback), subjects did not perform in a countercompliant manner during the test session. The verbal data indicated that subjects in the Effective GSR

feedback conditions believed that the subception procedure exercised control over physiological attitude measures. However, it may be the case that a strong perception of extrinsic causality may not have been established. First, subjects may have simply been repeating the feedback instructions on the questionnaire in order to please the experimenter. This notion is supported by the fact that in Experiments II and III, where no GSR feedback was given, there were no compelling verbal data that indicated that any group perceived the subception as exercising strong control. Second, informal discussions with subjects after the experiment revealed an egocentric bias with regard to inferring causality. Many of the subjects were quite willing to acknowledge that subception could be effective with people in general, but extremely dubious about the idea of such a subtle procedure exercising control over their own preferences. Other subjects expressed an informal conviction that, as a general rule, people are aware of the causes of their own behavior. Some of these subjects were incredulous that a stimulus whose existence was not evident could possibly affect behavior.

Unfortunately, clear-cut conclusions from Experiment I are not possible. It may be the case that (1) the perception of external constraint was not successfully induced by the GSR feedback procedure, or that (2) perceived control was achieved but did not have the expected effects on

performance. This conclusion, of course, exemplifies one of the major weaknesses of use of attributions as mediating variables (Bem, 1972; Fiedler, 1982; Reiss & Sushinsky, 1976). Given unexpected results, we can't know if the theory was incorrect, or the appropriate attribution did not occur. This state of affairs is complicated by the fact that there is no particular reason to believe that either the process or outcome of naive attributional analysis is available to introspection (Nisbett & Ross, 1980; Nisbett & Wilson, 1977).

While the role of perceived constraint is unclear, the present investigation shows that attempted constraint is an important variable. Experiments II and III indicate that countercompliance is most likely to occur when salience of attempted control is high, and when the control procedure is associated with negatively valued social agents. The data from the Positive context conditions, Experiment III, indicates that salience of attempted control is not a sufficient antecedent of countercompliance. When the constraint procedure was described as typically used by good agents for the benefit of mankind, compliance effects were obtained.

The results of the three experiments can be accounted for using cognitive balance theory (Heider, 1958). According to balance theory, compliance or countercompliance (with instructions, reward contingencies, etc.) will be partially determined by the context of interpersonal relations. If



the method of control is positively valenced, compliance is likely to occur. Conversely, countercompliance effects should be seen with negatively valenced means of control. In Experiment I, compliance occurred independent of feedback designed to vary the salience of functional constraint. This is consistent with cognitive balance theory if we assume that subception was positively valued. In Experiments II and III, compliance effects resulted when the constraint procedure was described as either a test of sensitivity or a therapeutic tool. Only when subception was described as being used by dubious characters for selfish purposes were countercompliance effects obtained.

Other studies have found evidence of cognitive balance effects on value as a function of the imposition of constraints. Seta and Carstens (Note 4) investigated the interaction of sanctions and affective context with preschool children. First, all the children were shown an attractive target toy. Half of the children were told that they would be allowed to play with the toy, and half were told that they would not. Then the children had either a positive or negative interaction with the experimenter. In the positive conditions, the subjects watched an interesting cartoon film, during which the experimenter interacted with the subjects. Children in the negative conditions watched a boring film (senators discussing politics) while being ignored by the

experimenter. Finally, a second experimenter allowed the children to play with the target toy and three other toys in a free play setting. There was a significant Sanction x Context interaction for target activity performance. Following the Positive context, the children complied with the sanctions of the first experimenter (Can play > Cannot play). The opposite effect occurred following the negative context, with more target activity performance in the Cannot play condition.

Worchel and Arnold (1973) investigated compliance and countercompliance in the context of constraints imposed by censorship. Adult subjects were told that they either would or would not be allowed to hear a particular communication. The subjects were told that free access to the communication had been threatened by either a positively or negatively valenced censor. Then, with no subjects ever actually hearing the censored message, Worchel and Arnold assessed (1) the subjects' desire to hear the communication, and (2) the subjects' attitudes towards the topic of the communication.

In terms of desire to hear the censored message, the data were consistent with reactance rather than balance theory. Subjects who had been told that they could not hear the communication rated a stronger desire than did subjects who expected to subsequently hear the communication. This effect occurred for both Positive and Negative censors. The data on attitudes towards the topic of the communication

indicated the operation of both reactance and balance processes. There was a significant main effect for Expectation, with subjects who expected not to hear the message shifting their attitudes away from those of the censor, as would be predicted by reactance theory. There was also an interaction, such that subjects in the Positive-Expect-to-hear group shifted attitudes towards the censor. When the censor was described as a positive agent of social control, subjects who could overcome the censor (they would eventually hear the communication) complied with the censor's position.

Experiments II and III of the present investigation are comparable to the Expect-to-hear conditions of Worchel and Arnold. In the expect-to-hear groups, the constraint was rather mild, given that the attempted censorship would eventually be overruled. Similarly, any perceived constraint imposed by the subception procedure was not sufficient to totally deny access to the activities, since all subjects sampled all three activities during Session 1. The results of the present investigation and the findings of Worchel and Arnold would suggest a tentative speculation about the conditions under which reactance or balance effects will occur. If the constraint manipulation comprises an impassable barrier, then countercompliance should occur, regardless of the valence of the agents of control. If the constraint is weaker, or perhaps seen as ineffective, cognitive balance theory may provide better predictions. Under these

circumstances countercompliance should be expected with negative controlling agents, while compliance effects should occur with positively valenced agents.

The cognitive balance theory interpretation suggests that further attention should be paid to interpersonal relationship factors in the study of overjustification effects. In particular, the individuals' attitude towards the agent of social influence, and towards the sponsoring institution, should influence the magnitude and direction of value shifts.

#### Cognitive Balance Theory and Attribution Theory

It has been argued that the results of the present investigation are more nearly consistent with balance theory than with attribution theory. Kelley (1973), however, has provided a model which incorporates both discounting and balance processes within an attributional framework. According to Kelley, there are a number of different causal schemata that are used to infer causality. These schemata, or a priori causal theories (Nisbett & Ross, 1980), are conceptualized as cognitive structures that exist before exposure to the events that are to be explained (Bartlett, 1932). The immediate circumstances, plus the cultural and developmental history of the individual, determine which schemata will be used to account for which events. For example, there is the multiple sufficient causal (MSC) schema, in which a single cause is chosen from among a set of potential causes to explain some event. Another hypothesized structure is

the multiple necessary causal (MNC) schema, in which at least two causes must be inferred in order to provide a satisfactory explanation.

As a general rule, simple schemata are preferred over more complex ones (Cunningham & Kelley, 1975; Kanouse, 1971). According to Kelley (1973), both discounting and cognitive balance can be viewed as simple schemata. The use of a discounting (or augmenting) schema presupposes that a single cause is sufficient to account for a particular event. A more sophisticated causal analytic approach would consider interactions among a number of potential causes. The use of a balance schema is also fairly simple, in that evaluative factors intrude into the inference process. In formal discourse, the use of balance "reasoning" is called an ad hominem argument, and is considered unacceptable.

Nisbett and Ross (1980) have suggested a number of reasons why the typical overjustification procedure should encourage the use of simple schemata such as discounting or balancing. First, the event to be explained (performing the target activity) is fairly mundane. The subject is asked to perform an activity, usually with a cover story that is designed to fit the subject's expectations about what goes on in a psychology experiment. Mundane events tend to evoke simple schemata, while more complex schemata tend to be reserved for explaining unusual or extreme events (Cunningham & Kelley, 1975). Second, the subject is not aware that his

or her attributional capabilities are the focus of the study; hence, there is little motivation to impress the experimenter with inferential complexity. Third, the event to be explained is probably not very important to the subject. We would not expect the individual to invest a great deal of time and energy towards analyzing the cause of performance. Fourth, the situation is typically structured in such a way as to evoke simple schemata. The incentive is made as salient as possible, while the potential for the perception of other extrinsic causal factors is minimized. Finally, and most important, the subject has a limited amount of information as input for a causal analysis. Since the subject is run individually, he or she cannot compare performance with that of other subjects. Nor can the individual conduct any kind of informal analysis of the covariation of responding under various incentive conditions, since a single treatment is given to a particular subject.

Given the parameters of the typical overjustification experiment, we should expect to see evidence of the use of simple causal schemata. The fact that the present investigation produced results consistent with balance theory rather than discounting may be due to salience factors in the retrospective misattribution procedure. In the typical overjustification study the subject is led, prior to initiating performance, into perceiving some extrinsic factor as a sufficient cause of performance. In the present experiments,

however, the salience of the extrinsic "cause" (subception) was considerably reduced by delaying the manipulation until the treatment session was completed. In addition, the affective component, manipulated by descriptions of typical uses of subception, was made very salient by the experimenter's deliberately vivid descriptions. Thus, the relatively greater salience of the affective component produced results consistent with cognitive balance theory.

#### Problems with Schemata Interpretations

The major problem with attributional explanations of performance is circularity or tautology (Bem, 1972). The fact that performance effects occur as if they were mediated by a particular schema does not establish either the existence of the schema or its operation in the particular circumstances. Fiedler (1982) points out that the logic of validating the mediating variable in this way could lead, ad absurdum, to the postulation of an analogy schema for the solution of analogies, an abstraction schema for doing abstract problems, etc. An obvious solution would be to provide independent evidence for the existence of the mediating variable. Unfortunately, this has proven to be very difficult within the attributional literature.

In both the overjustification and insufficient justification literatures (e.g., Collins & Hoyt, 1972; Cooper, 1971), researchers typically attempt to independently assess the cognitive processes that presumably mediate value shifts.

This is done with structured questionnaires and with more informal postexperimental interviews. The results are quite consistent: it is much easier to obtain evidence of the value shifts than it is to obtain verbal data indicative of the operation of mediating attributions (Bem, 1972; Nisbett & Wilson, 1977). This holds true even when subjects are given the outcome of the study, the experimental hypotheses, and a theoretical explanation of the attributional account (Nisbett & Wilson, 1977). The present investigation is consistent with the literature in that there are no independent data validating the notion of causal schemata as mediators of value shifts.

Nisbett and his associates (Nisbett & Ross, 1980; Nisbett & Wilson, 1977) argue that the lack of independent validation of mediating attributions simply reflects the limits of introspection. Not only are people unaware of the operation of cognitive processes, they are also often unaware of the outcomes of those processes. If this is the case, then we need not be overly embarrassed when our subjects provide us with no independent evidence of the operation of schemata. Others, however, have objected strenuously to such theorizing (e.g., Bem, 1972). Bem suggests that the use of unconscious mediating variables must lead to the kinds of excesses seen in psychodynamic theories, in which all things are explicable after the fact. Given this serious problem, attributional approaches to social psychological phenomena



cannot be justified so much by precision and testability as by heuristic value (Fiedler, 1982) and by the importance of focusing attention on the inferential capabilities of the average person (Heider, 1958; Kelley, 1973; Ross, 1977).

Another problem with attributional explanations of performance involves the link between the mediating variable and the dependent variable (Bem, 1972). Assuming that some procedure results in a discounting of intrinsic motivation, how does that translate into a subsequent performance decrement? A related problem concerns the relationship between dependent measures that are theoretically mediated by the same cognitive processes. If verbal ratings and performance measures are both assumed to be indicative of value, and if value is mediated by a common set of attributional processes, then one would expect to see a strong relationship between the two dependent variables. Verbal and performance measures did not covary consistently in the present investigation. Only in Experiment III were the verbal and performance measures consistent. Other overjustification studies (e.g., Arnold, 1976; Farr, Vance, & McIntyre, 1977; Fisher, 1978; Ryan, 1982) have also found inconsistent results in verbal and performance measures of value.

### Scripts

An alternative to the schemata interpretation of the present investigation can be based on the notion of "scripts"

(Schank & Abelson, 1977). The script concept employs a dramatic metaphor, in which persons are viewed as actors on various stages. The diversity of social interaction situations is subsumed under a set of scripts, each with its own stock personae with predictable roles. An individual, upon entering a social situation, identifies the script and his or her role on the basis of a limited set of cues. Once the individual assumes a particular role, he or she carries out the behaviors associated with that role in a somewhat "mindless" fashion (Langer, 1978). For example, a student entering a lecture course may assume that it's the instructor's role to say boring things, and the student's role to write them down. The instructor's attempts to encourage the student to take a more active role may be unsuccessful because it violates the standard script.

Kelley's attribution theory and the script model differ in terms of the emphasis placed upon the individual as an information processor. Kelley's "lay scientist" continually collects data, estimates covariations, and compares rival causal hypotheses. The script-actor is a simpler soul; once the proper script and role have been identified, very little causal analysis occurs.

A script approach to the results of the present investigation would involve adherence to a simple set of rules. It's a good thing to comply with authority figures, unless those figures are associated with wrongdoing. In that case,

countercompliance is a good thing. This interpretation is consistent with the finding that countercompliance occurred only when the typical user of subception was described as a brainwasher. The script approach deemphasizes the search for controlling variables and the impact of perceived constraint on subsequent value. Simply being in a situation where attempts at constraint are made, coupled with the purposes of the controlling agent, will dictate compliance or countercompliance. Thus the perceived constraint manipulation in Experiment I was ineffective in producing countercompliance.

#### Control and Attempted Control

According to the attributional and self-perception analyses, the degree to which subjects perceive the reward as controlling performance is a critical determinant of overjustification effects. An external attribution of sufficient cause, accompanied by a decrease in perceived intrinsic motivation, is a necessary antecedent of overjustification effects. The results of the present studies do not provide strong support for this position. In Experiment I, an attempt was made to manipulate perceived constraint in a direct fashion. Subjects were told that the subception procedure either did or did not exercise control over a physiological index of preference. Questionnaire results indicated that the subjects may have believed the false

physiological feedback. Nonetheless, overjustification or countercompliance effects did not occur in Experiment I.

In Experiments II and III, countercompliance effects occurred only when there was a strong manipulative attempt coupled with negative connotations. However, the questionnaire data provided no indication that the subjects in these studies believed that the subception procedure exercised functional control. In addition, informal discussions with the subjects yielded no compelling evidence that they believed that functional control occurred.

While a number of studies have been cited as supporting the notion of perceived constraint as an antecedent to overjustification effects, a reexamination of the literature shows that this is not necessarily so. For example, several studies have found that surveillance, while performing a target activity, reduces subsequent interest in the task (Lepper & Greene, 1975; Pittmann, Davey, Alafort, Wetherill, & Kramer, 1980). These results have been interpreted as evidence that the audience induces perceptions of constraint, which reduces intrinsic motivation. None of these experiments, however, provides any independent measures indicating that subjects under surveillance perceived any constraint. Ryan (1982) and Pittmann et al. (1980) found that controlling feedback (e.g., "you're doing fine, just as you ought to") reduced subsequent intrinsic interest relative to informational feedback ("you're doing fine"). Again, neither study

included any independent data suggesting that the controlling feedback increased perceptions of constraint. Fisher (1978) manipulated the type of payment schedule in an attempt to alter perceived control. The two payment conditions differed significantly on verbal ratings of perceived constraint, but verbal measures of intrinsic motivation were not affected.

Karniol and Ross (1979) reported data indicating that the salience of manipulative intent can produce "discounting" effects even in subjects who make minimal use of a discounting schema. Karniol and Ross selected subjects by pretesting kindergarten children for discounting ability. The children listened to two stories in which an actor performed a particular activity. In one story the actor performed in the presence of social influence, while in the other story the actor was unconstrained. The children were then asked which actor liked the target activity best. Discounters were defined as children who selected the unconstrained actor, and children who selected the constrained actor were defined as additive.

In the experiment proper, only children who failed to demonstrate the use of discounting were selected as subjects. All the subjects were shown a film in which an agent rewarded another person for playing with a target toy. In the manipulative condition, the agent explained that the purpose of the reward procedure was to constrain behavior. In the nonmanipulative condition, the agent explained that she was

being nice and wanted the person to have a reward. All subjects were exposed to both film conditions, and then asked to decide which actor had liked the toy best. A significantly higher proportion of children inferred greater intrinsic motivation in the nonmanipulative than in the manipulative condition, even though the children had previously failed to show evidence of discounting.

The overjustification literature shows that attempted constraint, not perceived constraint, is an antecedent of countercompliance effects. It may be the case that countercompliance is most likely to occur when social influence attempts are salient, but the individual perceives the attempts as being ineffective. There are numerous situations in which we find ourselves under the influence of other people. A blind tendency to react oppositionally to all forms of constraint would lead to condemnation from a variety of social institutions. It is reasonable to assume that countercompliance is a selective phenomenon, i.e., that it tends to occur when oppositional behavior is unlikely to be punished. This would happen when the attempts at constraint are seen as weak or totally ineffective. In any case, further research on this point is warranted, especially in light of the fact that there is no compelling evidence that perceived constraint is associated with overjustification or countercompliance effects.

### Summary and Conclusions

Overjustification effects have been explained in terms of the changes in locus of causality that occur when an interesting activity is performed under some extrinsic incentive condition. Alternative explanations assign a critical role to the differences in treatment-session performance that occur with and without incentives. In the present series of investigations, a method was used in an attempt to systematically alter locus of causality while ruling out the possibility of differential treatment-session performance effects. This was done by using a bogus subliminal perception procedure, in which subjects were told after the treatment session that they had been subjected to subtle influence communications. In fact, no such communications occurred during the treatment session, so that differential performance effects could not occur.

The results indicated that overjustification effects (countercompliant behavior) occurred when the salience of attempted constraint was high, coupled with negative intentions on the part of the typical controlling agency. Salient attempts at constraint in a positive context did not produce countercompliance. Likewise, feedback indicating functional constraint was not sufficient to produce countercompliance. These findings were interpreted as being consistent with cognitive balance theory. The results suggest that more attention should be paid to the impact of the

interpersonal relationship context of attempted control in overjustification effects. In addition, research should be directed towards examining the contributions of attempted constraint versus perceived constraint in overjustification effects.



## Footnotes

<sup>1</sup>Catania (1973) also proposed an analysis in which reinforcement has both excitatory and inhibitory effects.

<sup>2</sup>Behavioral and incentive contrast refer to situations in which there is an interaction between a given condition of reinforcement and other contemporary or previous conditions of reinforcement. Between-subjects investigations are typically labeled as incentive contrast, while behavioral contrast refers to within-subjects methodology (Dunham, 1968).

<sup>3</sup>Reinforcement refers to an increase in the frequency and/or duration of performance of a target activity due to a multiple reward procedure, while incentive effects refer to the same kinds of behavior changes in a single reward procedure.

<sup>4</sup>Lack of uniformity in the description of contingency procedures in the overjustification literature has led to some confusion (Condry, 1977). In this paper the following terms are used:

Piece-rate payment refers to a reward schedule in which a specified amount of reward is given per specified production unit.

Participation payment requires the subject to engage in the task for some period of time in order to receive payment.

Minimum performance is a participation schedule with a minimum criterion necessary for payment.

A wait-contingency simply requires the subject to be in the experimental situation for a certain amount of time in order for payment to occur.

<sup>5</sup>Several of the questionnaire items were filler items. Responses to these questions are not included for this experiment or for subsequent experiments.

<sup>6</sup>For post-hoc comparisons within the factorial design, Tukey HSD contrasts were used. The error term for the Control group was not included in the Tukey HSD calculations. For comparisons between the Control condition and experimental conditions, the Dunnett's test was used. The error term was obtained by doing a one-way ANOVA on all conditions, including the Control (Himmelfarb, 1975). All post-hoc tests were two-tailed. The alpha level was set at  $p < .05$ , unless otherwise specified. These procedures were followed for Experiments II and III.

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APPENDIX A  
DATA SHEET

Name \_\_\_\_\_ Age \_\_\_\_\_ Sex \_\_\_\_\_ Date \_\_\_\_\_

Time \_\_\_\_\_ Exp. \_\_\_\_\_ Code \_\_\_\_\_

SESSION 1

1. M G S	9. M G S	17. M G S	25. M G S
2. M G S	10. M G S	18. M G S	26. M G S
3. M G S	11. M G S	19. M G S	27. M G S
4. M G S	12. M G S	20. M G S	28. M G S
5. M G S	13. M G S	21. M G S	29. M G S
6. M G S	14. M G S	22. M G S	30. M G S
7. M G S	15. M G S	23. M G S	31. M G S
8. M G S	16. M G S	24. M G S	32. M G S

Totals: M \_\_\_\_\_ G \_\_\_\_\_ S \_\_\_\_\_ Sum = \_\_\_\_\_ Target = \_\_\_\_\_

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SESSION 2

1. M G S	9. M G S	17. M G S	25. M G S
2. M G S	10. M G S	18. M G S	26. M G S
3. M G S	11. M G S	19. M G S	27. M G S
4. M G S	12. M G S	20. M G S	28. M G S
5. M G S	13. M G S	21. M G S	29. M G S
6. M G S	14. M G S	22. M G S	30. M G S
7. M G S	15. M G S	23. M G S	31. M G S
8. M G S	16. M G S	24. M G S	32. M G S

Totals: M \_\_\_\_\_ G \_\_\_\_\_ S \_\_\_\_\_ Sum = \_\_\_\_\_

Duration Target = \_\_\_\_\_



APPENDIX B  
QUESTIONNAIRE

Name \_\_\_\_\_

1. How much did you enjoy each of the following activities?  
Please circle the number best corresponding to your opinion:

Maze	1	2	3	4	5	6	7	8	9
Gravitation	1	2	3	4	5	6	7	8	9
Simon	1	2	3	4	5	6	7	8	9
	Not at all				Very much				

2. How challenging did you find each of the following activities?

Maze	1	2	3	4	5	6	7	8	9
Gravitation	1	2	3	4	5	6	7	8	9
Simon	1	2	3	4	5	6	7	8	9
	Not at all				Very much				

3. How competent were you at each of the following activities?

Maze	1	2	3	4	5	6	7	8	9
Gravitation	1	2	3	4	5	6	7	8	9
Simon	1	2	3	4	5	6	7	8	9
	Not at all				Very much				

4. Did the music contain a hidden message? \_\_\_\_\_ If so,  
what was the content of that message?



10. How much did you enjoy participating in this experiment?

1	2	3	4	5	6	7	8	9
Not at all							Very much	

11. Would you be willing to volunteer to participate in a very similar experiment in the future?

1	2	3	4	5	6	7	8	9
Not at all							Very much	

12. Did you find the activities, on the whole, to be interesting?

1	2	3	4	5	6	7	8	9
Not at all							Very much	

13. Did you perform the following activities because they were enjoyable, or because of other reasons?

Maze	1	2	3	4	5	6	7	8	9
------	---	---	---	---	---	---	---	---	---

Gravitation	1	2	3	4	5	6	7	8	9
-------------	---	---	---	---	---	---	---	---	---

Simon	1	2	3	4	5	6	7	8	9
	Enjoyable							Other reasons	

Thank you.

APPENDIX C  
INSTRUCTIONS, EXPERIMENT I

[Experimenter escorts subject to the lab room, engages in a "warm-up" chat for approximately 1 minute.]

ALL CONDITIONS:

"Let me explain what we'll be doing here today. We are interested in getting measures of your preference, in terms of both attitudes and physiological responding, for a number of experimental activities. I'm going to ask you to try out a few activities for about 8 minutes. During that time, I'll be recording your psychogalvanic skin response by means of these electrodes (indicate) which are attached to this apparatus (indicate). The psychogalvanic skin response provides a physiological measure of momentary changes in arousal and emotion. Following this 8-minute period, I'll ask you to fill out a questionnaire concerning your attitudes towards the experimental activities. Do you have any questions so far?"

[Experimenter explains that participation is voluntary, and that the subject is free to withdraw at any time. The subject signs a consent form.]

"OK, we're ready to go. First let me demonstrate these activities. [Experimenter demonstrates the use of the 3 games, then attaches the GSR electrodes to the subject's left wrist.] "What I'd like you to do is very simple. For the next 8 minutes, I'd like you to try out these 3 activities,

You may try them as little or as long as you like, and in any order that you like. I would like you to try each activity at least once. While you're doing that, I'll be over here (indicate) monitoring your psychogalvanic skin response. Again, the psychogalvanic skin response provides a physiological measure of your true feelings towards the activities. At the end of 8 minutes, I'll give you a questionnaire about your opinions of the activities. Any questions? While we're doing this I'm going to play some music. [Experimenter cuts on music, Session 1 begins.]

[After 8 minutes, the experimenter stops the music and removes the GSR electrodes.]

CONTROL GROUP: "OK, that's fine. As I said, I want to give you a questionnaire. I need to run down the hall and get the questionnaire, and I also need to check in with another person who's working on something else. I'll be back as quick as I can, in just a few minutes. You can play with the games if you like."

EXPERIMENTAL GROUPS:

"OK, that's fine. Now I can explain to you fully what this experiment was about. Have you ever heard of persuasion through hidden messages? In subliminal perception, a message is delivered directly to the unconscious mind, below the level of conscious awareness. You may have heard, for example, of movie theaters showing brief frames of popcorn during

the movie. Even though the people in the theatre are not aware of the hidden message, the message reaches the unconscious and induces them to purchase popcorn. Another example is found in department stores, where hidden messages against shoplifting are sometimes embedded in music piped in over the loudspeakers. In this experiment, we put hidden messages in the music in an attempt to alter your feelings toward X. Specifically, the message attempted to (increase, decrease) your preference toward X, as measured by the psychogalvanic skin response. Just as a demonstration, I have another tape in which the hidden messages are enhanced so that they're clearly audible." [Play demonstration tape.]

[For NO FEEDBACK groups, the experimenter introduces Session 2 as done with the CONTROL group.]

#### EFFECTIVE FEEDBACK

"The psychogalvanic skin response showed that, in your case, the hidden message was very effective in influencing your feelings towards X. Your readings show a definite (decrease, increase) during the times that you were participating in X. Your readings were much (lower, higher) for X than they were for Y and Z. So these psychogalvanic skin response data show that the subliminal message was very effective in influencing your attitude toward X.



## INEFFECTIVE FEEDBACK

"The psychogalvanic skin response showed that, in your case, the hidden message was not at all effective in influencing your feelings towards X. There was no definite increase or decrease in your psychogalvanic readings when you were participating in X. Your readings for X were the same as your readings for Y and Z. So these psychogalvanic skin response data show that the subliminal message was not at all effective in influencing your attitude toward X."

[For FEEDBACK groups, the experimenter introduces Session 2 as was done with the CONTROL group.]

[At the end of Session 2, the experimenter returns with the questionnaire. After completing the questionnaire, the subject is debriefed, thanked, and excused.]

## Transcripts of Demonstration Tapes

"Encourage" tape:

5 secs music

"Play with the \_\_\_\_\_. The \_\_\_\_\_ is the best game."

5 secs music

"You'll enjoy the \_\_\_\_\_ best. Don't bother with the other games."

5 secs music

"You really enjoy the \_\_\_\_\_. The \_\_\_\_\_ is the very best game."

"Discourage" tape:

5 secs music

"Do not play with the \_\_\_\_\_. The \_\_\_\_\_ is the worst game."

5 secs music

"You will not enjoy the \_\_\_\_\_. The other games are more interesting."

5 secs music

"You really do not like the \_\_\_\_\_. The \_\_\_\_\_ is the very worst game."

APPENDIX D  
INSTRUCTIONS, EXPERIMENT II

[The experiment is introduced as in Experiment I. None of the subjects are given any GSR Feedback. The LOW SALIENCE and HIGH SALIENCE instructions below follow Session 1.]

#### LOW SALIENCE

This experiment is an investigation of people's ability to detect subtle auditory stimulation. In a technique called subliminal stimulation, verbal messages are embedded in background music. These messages are recorded in the music track at a low volume. Theoretically, the message may get through even though the individual may not be aware of hearing the message.

Many psychologists have recently become interested in people's ability to detect subtle stimuli. For example, cases of "mind reading" may be explained scientifically if it can be demonstrated that the so-called "mind reader" is really simply responding to subtle nonverbal communications. In another example, the ability to predict changes in the weather may simply occur because of a perception of slight changes in barometric pressure. These kinds of phenomena have stimulated research into the sensitivity to subtle cues.

The present experiment is designed to investigate some of the variables that determine the efficacy of subliminal stimulation. The music that was playing contained low-volume messages directed towards changing your attitude towards X.

Specifically, the message attempted to (increase, decrease) your preference towards X, as measured by the psychogalvanic skin response. [Experimenter plays demonstration tape.]

#### HIGH SALIENCE

This experiment is an investigation of a form of mind control called subliminal persuasion. In subliminal persuasion techniques, commands to act in a particular way or to believe in certain ideas are embedded in background music. These commands are recorded in the music track at a low volume. Theoretically, the commands can exert mind control even though the individual may not be aware of hearing the commands.

Many people have become concerned that subliminal persuasion techniques may be used in brainwashing campaigns. For example, advertisers may use subliminal persuasion in an attempt to force people to purchase products against their will. In another example, it has recently been charged that some records and tapes contain subliminal commands in an attempt to coerce teenagers into believing certain religious or political doctrines.

The present experiment is designed to investigate some of the variables that determine the efficacy of subliminal persuasion. The music that was playing contained low-volume messages directed towards changing your attitude about X. Specifically, the message attempted to (increase, decrease)

your preference towards X, as measured by the psychogalvanic skin response. [Experimenter plays demonstration tape.]

APPENDIX E  
INSTRUCTIONS, EXPERIMENT III

[All procedures are identical to those of the first two studies, except for the instructions at the end of Session 1, below.]

ALL EXPERIMENTAL GROUPS:

"OK, \_\_\_\_\_, now that we've finished, I can explain to you more fully what this experiment is all about--I didn't tell you all the details earlier."

"This experiment is an investigation of a form of mind control called subliminal persuasion. In subliminal persuasion techniques, commands to act in a particular way or to believe in certain ideas are embedded in background music. These commands are recorded in the music track at a low volume, so softly that the person listening to the music is usually not even aware of the commands."

"Research has shown that subliminal persuasion techniques can be very powerful in influencing attitudes and behavior. Previous experiments have shown that a wide variety of attitudes and behaviors can be changed in this way, even though the listener is not aware of hearing the subliminal communications."

[The experimenter then reads either the Positive or Negative Context instructions.]



Positive and Negative Context Instructions

POSITIVE:

"Psychologists have recently become very interested in subliminal persuasion because of its potential for helping people. For example, subliminal persuasion has been used to help people quit smoking and lose weight. Subliminal messages urging people to have confidence in their ability to overcome these problems are embedded in background music at certain weight-control and smoking clinics. In another example, subliminal persuasion has been used to treat depressed patients. Depressed people often have very low self-esteem; subliminal persuasion can be used to encourage the patients to value themselves as human beings. Finally, there is some evidence that subliminal persuasion may help hyperactive children in schoolwork. The subliminal messages encourage the children to concentrate on their work and to keep trying even if the work sometimes seems difficult."

"The present experiment is designed to investigate some of the factors involved in subliminal persuasion. The music that was playing earlier (indicate tape deck) contained low-volume messages directed towards changing your attitude about X. Specifically, the message attempted to (increase, decrease) your preference towards X, as measured by the psychogalvanic skin response."

[Experimenter then plays the tape "demonstrating" subliminal messages, and initiates Session 2.]

## NEGATIVE:

"Psychologists have recently become very interested in subliminal persuasion because of its potential as a means of abusing human rights. For example, it has recently been charged that the Soviet Secret Police may be using subliminal persuasion to indoctrinate school children to Communist propaganda. In another example, some cults are accused of using subliminal persuasion to recruit young men and women. Young people are invited to a cult for a visit, then exposed to subliminal messages encouraging them to abandon their values of family, religion, and country. Finally, there is some evidence that unscrupulous merchants may use subliminal persuasion to get shoppers to buy low-quality products that otherwise probably wouldn't be sold. Music in the store loudspeakers may contain messages encouraging people to buy shoddy goods."

"The present experiment is designed to investigate some of the factors involved in subliminal persuasion. The music that was playing earlier (indicate tape deck) contained low-volume messages directed towards changing your attitude about X. Specifically, the message attempted to (increase, decrease) your preference towards X, as measured by the psychogalvanic skin response.

[Experimenter then plays the tape "demonstrating" subliminal messages, and initiates Session 2.]

APPENDIX F

TABLES

Table 1

Summary of the Relationship Between Prior  
Reinforcement/Incentive Effects and  
Post-Reward Measures of Intrinsic Motivation

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A. No reinforcement data presented:

Anderson et al., 1976	Karniol & Ross, 1977
Arnold, 1976	Kruglanski et al., 1971
Calder & Stow, 1975	McLolyd, 1979
Danner & Lonky, 1981	Morgan, 1981
Deci, 1972	Pittmann et al., 1977
Farr et al., 1977	Rosenfield et al., 1977
C. Fisher, 1978	Swann & Pittmann, 1977
Harackiewicz, 1979	

B. Overjustification effects occurred without prior reinforcement/incentive effects:

Boggiano & Ruble	Lepper et al., 1973
Deci, 1971, Exp. II	Pritchard et al., 1977
Deci, 1972 (reinforcement data reported in Deci et al., 1975)	Ross, 1975
Dollinger & Thelen	Ross et al., 1976
Enzle & Ross, 1978	Smith & Pittmann, 1978
Lee et al., 1976	Weiner & Mander, 1978

C. Overjustification effects occurred following prior reinforcement/incentive effects:

Carstens et al., Note 1	Greene et al., 1976 (low initial value activity)
Carstens & Seta, Note 2	Lepper & Greene, 1975
E. Fisher, 1979	Loveland & Olley, 1979
Fuoco, Note (token rewards)	

D. Overjustification effects did not occur following prior reinforcement/incentive effects:

*Davidson & Bucher	Greene et al., 1976 (high initial value activity)
Feingold & Mahoney	
*Fuoco (praise and praise + token reward)	*Reiss & Sushinsky, 1975, Exp. II
	Williams, 1980

\*Post-reward measures indicate increase in intrinsic motivation.

Table 2

Mean Likert Scale Ratings on Q8b, Experiment I:  
The Higher the Number, the Higher the Reported Effect

	Ineffective	No Feedback	Effective
Encourage	1.6	2.6	5.0
Discourage	1.3 (n=9)	3.7	5.0 (n=8)

Table 3

ANOVA Summary Table, Ratings on Q8b, Experiment I

A = Subliminal,	a = 2	N = 57		
B = GSR Feedback,	b = 3	n = 8-10		
SV	df	SS	MS	F
A	1	0.749	0.749	< 1
B	2	114.959	57.479	12.37**
AB	2	5.637	2.819	< 1
S/AB	51	236.900	4.645	
Total	56	358.246		

\*\*p < .01

Table 4

Mean Estimates of the Percentage of Time Spent on the Target Activity During Session 1, Experiment I (Q5)

	Ineffective	No Feedback	Effective
Encourage	35.5	22.8 (n=9)	46.5
Discourage	28.9 (n=9)	27.3	27.0
Control	32.3		

Table 5

ANOVA Summary Table, Estimates of the Percentage of Time Spent on Target Activity During Session 1, Experiment I (Q5)

A = Subliminal,                      a = 2                      N = 58  
 B = GSR Feedback,                      b = 2                      n = 9-10

SV	df	SS	MS	F
A	1	849.724	849.724	5.80*
B	2	1329.786	664.893	4.54*
AB	2	1355.429	677.714	4.63*
S/AB	52	7615.544	146.453	
Total	57	11150.483		

\*p < .05

Table 6

Mean Likert Scale Ratings of "Interest" and "Enjoyment"  
of the Target Activity (Q1 + Q9), Experiment I

	Ineffective	No Feedback	Effective
Encourage	12.8	10.1	14.7
Discourage	11.2	9.2	9.7
Control	14.6		

Table 7

ANOVA Summary Table, Likert Scale Ratings of "Interest" and  
"Enjoyment" of the Target Activity (Q1 + Q9), Experiment I

A = Subliminal,	a = 2	N = 60		
B = GSR Feedback,	b = 3	n = 10		
SV	df	SS	MS	F
A	1	93.750	93.750	3.76*
B	2	80.433	40.217	8.76**
AB	2	48.100	24.050	2.25
S/AB	54	577.900	10.702	
Total	59	800.183		

\*p < .05

\*\*p < .01

Table 8

Mean Likert Scale Ratings of Whether the Target Activity Was Performed Because It Was "Enjoyable" (1) or for "Other Reasons" (9.) Q13, Experiment I

GSR Feedback			
	Ineffective	No Feedback	Effective
Encourage	2.9	4.9	3.8
Discourage	4.1	5.0	3.1
	3.1		

Table 9

ANOVA on Responses to Q13, Experiment I

A = Subliminal,	a = 2	n = 10		
B = GSR Feedback,	b = 2	N = 60		
SV	df	SS	MS	F
A	1	0.600	0.600	< 1
B	2	29.033	14.517	2.28
AB	2	9.100	4.550	< 1
S/AB	54	343.200	6.356	
Total	59	381.9333		



Table 10

Mean Number of Intervals in which the Subjects Performed  
the Target Activity During Session 2, Experiment I

		GSR Feedback		
		Ineffective	No Feedback	Effective
Encourage		8.0	6.8	12.8
Discourage		2.1	4.8	6.4
Control		11.1		

Table 11

ANOVA Summary Table, Number of Intervals in which the Subjects  
Performed the Target Activity, Session 2, Experiment I

A = Subliminal,		a = 2	N = 60	
B = GSR Feedback,		b = 3	n = 10	
SV	df	SS	MS	F
A	1	340.817	340.817	5.39*
B	2	238.033	119.017	1.88
AB	2	58.033	29.017	<1
S/AB	54	3412.100	63.187	
Total	59	4048.983		

\*p < .05

Table 12

Mean Number of Intervals in which the Subjects Performed  
Any of the 3 Experimental Activities  
during Session 2, Experiment I

	Ineffective	No Feedback	Effective
Encourage	24.8	24.7	24.8
Discourage	22.7	20.7	20.5
Control	27.4		

Table 13

ANOVA Summary Table, Number of Intervals in which the Subjects  
Performed any of the 3 Experimental Activities  
during Session 2, Experiment I

A = Subliminal,	a = 2	N = 60		
B = GSR Feedback,	b = 2	n = 10		
SV	df	SS	MS	F
A	1	180.266	180.266	1.18
B	2	15.433	7.716	< 1
AB	2	14.234	7.117	< 1
S/AB	54	8242.0	152.630	
Total	59	8451.933		

Table 14

Mean Likert Scale Ratings on Q8b, Experiment II:  
The Higher the Number, the Higher the Reported Effect

	Low Salience	High Salience
Encourage	2.29 n=7	2.50 n=8
Discourage	2.50 n=8	3.75 n=8

Table 15

ANOVA Summary Table, Likert Scale Ratings  
on Q8b, Experiment II

A = Subliminal,	a = 2	N = 32		
B = Salience,	b = 2	n = 7-8		
SV	df	SS	MS	F
A	1	4.069	4.069	<1
B	1	4.069	4.069	<1
AB	1	2.352	2.352	<1
S/AB	28	136.929	4.890	
Total	31	147.419		

Table 16

Mean Estimates of the Percentage of Time Spent on the Target Activity during Session 1, Experiment II (Q5)

	Low Salience	High Salience
Encourage	30.62 n=8	22.50 n=8
Discourage	28.89 n=9	23.75 n=8
Control	26.87 n=8	

Table 17

ANOVA Summary Table, Estimates of the Percentage of Time Spent on the Target Activity during Session 1, Experiment II (Q5)

A = Subliminal,	a = 2	N = 33		
B = Salience,	b = 2	n = 8-9		
SV	df	SS	MS	F
A	1	0.070	0.070	< 1
B	1	356.960	356.960	1.40
AB	1	18.950	18.950	< 1
S/AB	29	7398.260	255.110	
Total	32	7774.240		

Table 18

Mean Likert Scale Ratings of "Interest" and "Enjoyment"  
of the Target Activity (Q1 + Q9), Experiment II

	Low Saliency	High Saliency
Encourage	11.78	8.67
Discourage	11.89	10.11
Control	9.22	

Table 19

ANOVA Summary Table, Likert Scale Ratings of "Interest"  
and "Enjoyment" of the Target Activity  
(Q1 + Q9), Experiment II

SV	df	SS	MS	F
A	1	5.444	5.444	< 1
B	1	53.778	53.778	2.78
AB	1	4.000	4.000	< 1
S/AB	32	619.333	19.354	
Total	35	682.556		

Table 20

Mean Likert Scale Ratings of Whether the Target Activity Was Performed Because It Was "Enjoyable" (1) or for "Other Reasons" (9.) Q13, Experiment II

	Low Salience	High Salience
Encourage	4.89	6.11
Discourage	3.44	4.67
Control	5.44	

Table 21

ANOVA on Responses to Q13, Experiment II

A = Subliminal,	a = 2	n = 9		
B = Salience,	b = 2	N = 36		
SV	df	SS	MS	F
A	1	18.778	18.778	2.78
B	1	13.444	13.444	1.99
AB	1	0	0	< 1
S/AB	32	216.000	6.75	
Total	35	248.222		

Table 22

Mean Number of Intervals in which the Subjects Performed  
the Target Activity during Session 2, Experiment II

	Low Salience	High Salience
Encourage	15.78	3.67
Discourage	4.56	8.33
Control	5.22	

Table 23

ANOVA Summary Table, Number of Intervals in which the Subjects  
Performed the Target Activity, Session 2, Experiment I

A = Subliminal,	a = 2	N = 36		
B = Salience,	b = 2	n = 9		
SV	df	SS	MS	F
A	1	96.694	96.694	1.36
B	1	156.250	156.250	2.20
AB	1	568.028	568.028	7.99*
S/AB	32	2273.778	71.056	
Total	35	3094.750		

\*p < .01

Table 24

Mean Number of Intervals in which the Subjects Performed  
Any of the 3 Experimental Activities  
during Session 2, Experiment II

	Low Salience	High Salience
Encourage	26.00	13.22
Discourage	22.22	24.67
Control	22.33	

Table 25

ANOVA Summary Table, Number of Intervals in which the  
Subjects Performed Any of the 3 Experimental  
Activities during Session 2, Experiment II

A = Subliminal,	a = 2	N = 36		
B = Salience,	b = 2	n = 9		
SV	df	SS	MS	F
A	1	132.250	132.250	< 1
B	1	240.250	240.250	1.56
AB	1	521.361	521.361	3.38*
S/AB	32	4933.111	154.196	
Total	35	5826.972		

\*p .10



Table 26

Mean Likert Scale Ratings on Q8b, Experiment III:  
The Higher the Number, the Higher  
the Reported Effect

	Positive	Negative
Encourage	3.54 n=13	3.60 n=15
Discourage	3.83 n=12	3.62 n=13

Table 27

ANOVA Summary Table, Likert Scale Ratings  
on Q8b, Experiment III

A = Subliminal,                      a = 2                      n = variable  
B = Affective Context,                b = 2                      N = 53

SV	df	SS	MS	F
A	1	0.29	0.29	< 1
B	1	0.07	0.07	< 1
AB	1	0.26	0.26	< 1
S/AB	49	239.57	4.89	
Total	52	240.19		

Table 28

Mean Estimates of the Percentage of Time Spent on the Target Activity during Session 1, Experiment III (Q5)

	Positive	Negative
Encourage	38.52	32.33
Discourage	26.20	32.67
Control	32.67	

Table 29

ANOVA Summary Table, Estimates of the Percentage of Time Spent on the Target Activity during Session 1, Experiment III (Q5)

A = Subliminal, a = 2, n = 15

B = Affective Context, b = 2, N = 60

SV	df	SS	MS	F
A	1	540.000	540.000	2.64
B	1	0.266	0.266	<1
AB	1	601.667	601.667	2.94*
S/AB	56	11468.800	204.733	
Total	59	12610.733		

\*p < .10

Table 30

Mean Likert Scale Ratings of "Interest" and  
 "Enjoyment" of the Target Activity  
 (Q1 + Q9), Experiment III

	Positive	Negative
Encourage	12.27	11.13
Discourage	9.87	12.73
Control	11.93	

Table 31

ANOVA Summary Table, Likert Scale Ratings of "Interest"  
 and "Enjoyment" of the Target Activity  
 (Q1 + Q9), Experiment III

A = Subliminal,	a = 2	n = 15		
B = Affective Context,	b = 2	N = 60		
SV	df	SS	MS	F
A	1	2.400	2.400	<1
B	1	11.267	11.267	<1
AB	1	60.000	60.000	4.16*
S/AB	56	807.333	14.417	
Total	59	881.000		

\* $p < .05$

Table 32

Mean Likert Scale Ratings of Whether the Target Activity  
Was Performed Because It Was "Enjoyable" (1) or for  
"Other Reasons" (9.) Q13, Experiment III

	Positive	Negative
Encourage	3.60	5.40
Discourage	5.07	4.13
Control	5.00	

Table 33

ANOVA on Responses to Q13, Experiment III

A = Subliminal,	a = 2	n = 15		
B = Affective Context,	b = 2	N = 60		
SV	df	SS	MS	F
A	1	0.150	0.150	< 1
B	1	2.817	2.817	< 1
AB	1	28.017	28.017	4.36*
S/AB	56	359.867	6.426	
Total	59	390.850		

\*p < .05

Table 34

Mean Number of Intervals in which the Subjects Performed  
the Target Activity during Session 2, Experiment III

	Positive	Negative
Encourage	8.20	5.07
Discourage	4.47	12.07
Control	6.73	

Table 35

ANOVA Summary Table, Number of Intervals in which the  
Subjects Performed the Target Activity during  
Session 2, Experiment III

A = Subliminal,	a = 2	n = 15		
B = Affective Context,	b = 2	N = 60		
SV	df	SS	MS	F
A	1	40.017	40.017	< 1
B	1	74.817	74.817	1.14
AB	1	432.017	432.017	6.56*
S/AB	56	3688.000	65.857	
Total	59	4234.850		

\*p < .025

Table 36

Mean Number of Intervals in which the Subjects Performed  
Any of the 3 Experimental Activities  
during Session 2, Experiment III

	Positive	Negative
Encourage	18.20	19.07
Discourage	23.53	21.53
Control	24.47	

Table 37

ANOVA Summary Table, Number of Intervals in which the  
Subjects Performed Any of the 3 Experimental  
Activities during Session 2, Experiment III

A = Subliminal,	a = 2	n = 15		
B = Affective Context,	b = 2	N = 60		
SV	df	SS	MS	F
A	1	228.150	228.150	1.30
B	1	4.816	4.816	<1
AB	1	30.817	30.817	<1
S/AB	56	9794.800	174.907	
Total	59	10058.583		