SELF-HANDICAPPING:
THE MEDIATING ROLES OF UNCERTAINTY AND COST-ORIENTATION

DISTRIBUTION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

by

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To My Parents
And to Fred, Ginger, and Dave
ACKNOWLEDGMENTS

I would like to express my sincere appreciation to the many people who aided in the production of this work. Primarily, I would like to thank Bob Arkin for inspiring, exciting, challenging, encouraging, and supporting me. He showed me the value and enjoyment of research, taught me to write (magniloquently at times), and delighted and surprised me with his wonderful guidance, advice, and friendship. He always challenged me to think, to write, to create (and he challenged me on the court and sesquipedalianly in the dictionary).

The other members of my committee deserve thanks for their thoughtful attention, continued support and encouragement. More specifically, I express my gratitude to Steve Beck for standing by me through thin and plenty of thick, for his encouraging words, thoughtful attention, stimulating questions, and compassion. To Lyle Schmidt, I would like to express gratitude for serving on all of my committees, for his warm smiles, and for his thoughtful questions. I thank Tom Milburn for his comments and suggestions in the early stages of this project, for being at-the-ready when I needed a committee member, and for telling me to believe in myself. My appreciation is extended to Franklin Banks who was a wonderful Graduate School Representative, who was friendly, thoughtful, and encouraging beyond the call of duty.

I cannot thank Michael Russo enough for his contributions to this project. I thank him for aiding in the writing of the computer program utilized in this research, for the hours of statistical savvy, computer knowledge, late night coffee (and Haagen daaz) breaks by the computer, and all of the friendship that developed through these and other trials and tribulations. Without James Shepperd none of this ever would have happened. I owe thanks to James for telling me about Bob and encouraging me
to contact him. I thank James for sending me the computer program that served as my main dependent measure. And finally, I thank him for his theoretical consultation, procedural advice, and frequent-flyer friendship. I express my deep appreciation to Carol, J.D., and Josh (or Josh and Josh) for allowing me to interfere with their family life during a critical year, for allowing me to interfere with their weekends, for letting me borrow computers, and especially for greeting me with a friendly voice on the other end of the phone. I thank modern technology (especially FAX machines), without which I would never have made any deadlines.

Finally, let me express my gratitude and love to my friends and family, who stuck by me through the precarious early stages of this project, through a dozen dissertation ideas, through drafts and deadlines. I will always remember their loving encouragement as I spent weekends and family vacations with the computer rather than with them. I thank my family and friends for their encouragement, sensitivity, understanding, love, and of course humor.
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INTRODUCTION

Achievement and accomplishment are highly valued in Western society. Individuals face pressures to succeed and to achieve in academic pursuits, artistic endeavors, relationships, athletics, and almost every other facet of modern daily life. It is not a revelation to say that people who fall short of their expectations or goals will at times make excuses for their diminished performances in order to cushion personal disappointment or the evaluations of others. For example, students have a litany of excuses, including illness, deaths in the family, and procrastination, when their achievements fail to reach expectations. Moreover, it is not novel to suggest that individuals occasionally make excuses in advance of a performance in order to cushion possible failure. The athlete who, before the competition, remarks that he is "not one hundred percent" due to a muscle strain is illustrative of this phenomenon.

One type of excuse made in anticipation of an evaluative task may be termed self-handicapping. The concept was named by Jones and Berglas (1978; Berglas & Jones, 1978) and describes a set of actions that are undertaken to protect an individual's sense of competence. By self-handicapping, a person attempts to externalize failure attributions and to internalize success attributions before the performance is even attempted. Specifically, self-handicapping refers to the behaviors of an individual who "... reaches out for impediments, exaggerates handicaps, embraces any factor reducing personal responsibility for mediocrity and enhancing personal responsibility for success" (Jones & Berglas, 1978, p. 202). In short, the individual acquires, or calls attention to, a personal impediment that is expected to interfere with his or her ability to perform on an upcoming task.
Examples of self-handicapping are abundant in everyday life. Individuals may handicap an upcoming performance by staying up excessively late the night before taking a test. They may make hypochondriacal complaints, claim depressive or anxiety symptoms, or reduce effort as a means of establishing the existence of impediments. In fact, in the original formulation of self-handicapping, Jones and Berglas (1978) proposed that chronic alcoholism and underachievement can be understood as chronic self-handicapping behaviors. Self-handicapping, then, is a general concept that has the potential to explain a wide variety of actions.

Self-handicapping behaviors have also been demonstrated experimentally. In their original study, Berglas and Jones (1978) found that subjects would self-handicap by intentionally ingesting performance debilitating drugs. Subsequently, experimenters have extended the range of behaviors to include symptom presentation (Smith, Snyder, & Handelsman, 1982; Smith, Snyder, & Perkins, 1983), lack of effort in achievement tasks (e.g. Frankel & Snyder, 1978; Snyder, Smoller, Strenta, & Frankel, 1981), unattainable goal choice (e.g. Greenberg, 1985), and individual differences such as shyness (Snyder, Smith, Augelli, & Ingram, 1985), Type A behavior patterns (e.g. Strube, Boland, Manfredo, Al-Falaij, 1987), and others. For the past decade, self-handicapping has gained increasing attention from an increasingly wide selection of researchers, and the resulting body of literature is gaining prominence and visibility in both social and clinical psychology.

In explaining the motivation for self-handicapping, most researchers have subscribed to one of two schools of thought. One school asserts that self-handicapping is essentially a tactic for protecting self-esteem; the other contends
that self-handicapping is a self-presentational strategy. However, it is possible that esteem-protection and self-presentation are merely two manifestations of a more basic motivation for self-handicapping. It may be a defensive response employed by certain persons whenever there is any sort of self-relevant perceived evaluative threat. The current study was designed to explore two factors that were hypothesized to elicit a self-protective approach to an upcoming performance evaluation: self-handicapping was predicted to follow from situations that promote feelings of uncertainty about personal abilities and that focus the individual's attention on possibilities of failure rather than the potential for excellence.

**The Original Formulation of Self-handicapping**

The concept of self-handicapping originally was formulated to explain many behaviors, exemplified by alcoholism and underachievement, that can readily be observed in everyday life. It was posited (Jones & Berglas, 1978; Berglas & Jones, 1978) that people will use attributional principles in order to maintain self-esteem and protect their self-image of competence. Jones and Berglas (1978) first presented self-handicapping in a theoretical paper that sought to explain one underlying motivation for alcohol use and underachievement. They looked at these two broad and enduring behavior patterns and concluded that they are "symptoms" of a "self-defending" maneuver, established and maintained in order to protect self-esteem and which are perhaps heightened by the presence of observers. The theory predicts that when people who are uncertain of their competence are faced with a performance task, they will avoid diagnostic information that could confirm their feelings of inadequacy. More specifically, when success is doubtful, people will accomplish
self-esteem protection by seeking impediments, or handicaps, that will excuse personal responsibility for failure and enhance personal responsibility for success. In this way, the individual acts in a fashion so as to avoid any diagnostic information.

Following their theoretical paper, Berglas & Jones (1978) conducted an empirical study to provide support for their claim that self-handicapping behavior is elicited when an individual feels uncertain about his or her ability to perform a given task. Subjects were recruited for an experiment that allegedly tested the effect of a new drug on intellectual performance. On the first of two ostensible intellectual performance tests, subjects either experienced contingent success or noncontingent success. Contingent success subjects worked with solvable test items and received success feedback. They were expected to develop a feeling of knowledge and control and to enhance their sense of confidence and competence. Noncontingent success subjects worked unsolvable problems, but also received success feedback. Thus, to these subjects, the feedback was not contingent on their performance. Noncontingent success subjects were expected to attribute their success to chance or luck. These subjects were expected to doubt their ability to repeat this "successful" performance.

After the task performance and subsequent success feedback, subjects were given a choice of ingesting either a performance facilitating drug (called "Activil") or one that would be debilitating to performance ("Pandocrin"). In actuality, the drugs both were placebos. Drug choice was to be followed by a second, and similar, performance test. Before the drug choice, subjects were given additional instructions regarding the follow-up intellectual performance test. They were told that, for this second test, there would be a penalty for guessing. Wrong answers would result
in points subtracted from the final score. This procedure was added to exacerbate the doubt that subjects felt about their capacity to repeat their previous successful performance.

The authors hypothesized that subjects in the noncontingent success condition would self-handicap (i.e. choose the performance inhibiting drug) more than subjects in the contingent success condition. Further, this effect was predicted to be apparent in both the public and private conditions, since self-handicapping was hypothesized to serve a self-esteem protective function rather than a self-presentation function. Results generally supported the experimental hypotheses. However, it must be mentioned that the results only supported the hypotheses for men but not for women.

In proposing the theory of self-handicapping, Berglas and Jones (1978) sought to break with tradition. This theory was an important deviation from the generally accepted assertions of social psychology, embodied in the likes of social comparison theory (e.g. Festinger, 1954) and attribution theory (Kelley, 1967 & 1971; Heider, 1958). Such theories suggest that people are motivated to appraise their capacities and their environments accurately in order to cope with reality and gain control through the formulation of stable and accurate attributions regarding others, the environment, and themselves as well.

Berglas and Jones presented their ideas at a time when it was generally accepted by most social psychologists that people seek accuracy, not ambiguity. The authors, however, suggested a mechanism by which people could maintain some ambiguity regarding their own talents and abilities in order to "allow room for self-sustaining and self-embellishing fantasies" (p. 200). Of course, the idea that individuals do not
always seek accurate feedback is not unique to self-handicapping. It had already been suggested, for example, that information that is highly diagnostic of ability is appealing to individuals high in achievement motivation but not to individuals low in this motivation (e.g. Trope, 1975; Trope & Brickman, 1975; Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971). Rather than looking at individual differences, Berglas and Jones were suggesting one set of conditions that they believed would elicit a general desire to avoid diagnostic information. That is, they suggested a situation in which any individual should feel uncertain about his or her abilities and competencies and act to sustain that uncertainty.

**Discounting and Augmentation: The Underlying Attributional Principles**

In searching for the underlying explanation for self-handicapping, it has been suggested (e.g. Berglas & Jones, 1978; Arkin & Baumgardner, 1985; Strube & Roemmele, 1985) that self-handicapping is a sophisticated application of Kelley's (1972) principles of discounting and augmentation. Indeed, Kelley's principle of discounting and augmentation is the attributional principle that would seem to allow handicapping to occur. Kelley (1972) wrote of the "lay attributor" who struggles to understand and "exercise control of" his world (p. 2). In doing so, the individual generally attributes an effect to the potential cause with which, over time, it covaries (Kelley, 1967). That is, the individual assesses the possible causal factors and, under usual circumstances, acts as a "good scientist," examining the situations and behaviors of the individuals involved. Attending to the covariation between the effect in question and the variety of possible causes, the attributor is expected to select the most likely cause based on its temporal correspondence with the effect. Even with nonoptimal
amounts of information or incomplete information, the attributor is assumed to attempt a covariance analysis that is unbiased and reasonable (Kelley, 1971).

When the attributor is presented with an effect and more than one plausible cause, Kelley (1972) posited that if the individual is unable to make the desired covariance tests, he or she will use the available information and make the best causal judgments possible. To accomplish this, certain attributional heuristics, such as the discounting principle, are used. This principle states that "the role of a given cause in producing a given effect is discounted if other plausible causes are also present" (p. 8). The attribution to any one of the plausible causes is lessened, in terms of confidence, resulting in a reduction in the inferred magnitude of the cause. In cases of personal attributes, the attributor's ratings of the attributes would become more neutral. In sum, the attributor "discounts" the importance of a given cause when other plausible causes are present.

Describing a self-handicapping behavior in discounting terms may help to clarify this point. In the previously described Berglas and Jones (1978) study, subjects faced with an upcoming performance task ingested a performance debilitating drug. The authors interpreted the voluntary ingestion of the drug to be a self-handicapping behavior. The individual was acquiring an impediment in order to obscure the meaning of the potential poor performance. In discounting terms, the attributor would observe that the subject had ingested the drug and would understand that the drug could detract from the subject's performance on the task. The attributor, then, would be faced with attributional ambiguity, not knowing whether to attribute the poor performance to the subject's lack of ability or to the effects of the drug, the two major
plausible causes. The attributor would decide between these two causes based on the available data, but the attribution to lack of ability would be discounted due to the presence and influence of the other possible cause (e.g., the drug). The poor performance should be attributed less confidently to the subject’s lack of ability than would be the case if the subject had not ingested the drug.

The discounting principle, then, is proposed as the explanatory principle for the effectiveness of the self-handicapping strategy. That is, self-handicapping behavior is effective because individuals who are faced with the attributional dilemma of one effect that has more than one plausible cause resolve this disparity by discounting the cause and making the attribution with less confidence.

There are situations in which a subject will perform well in spite of some handicap. Such situations present the attributor with a slightly different attributional problem. The latter process may be described or explained by Kelley’s (1972) augmentation principle, a principle he considered to be a "reverse version" (p. 12) of his discounting principle. The augmentation principle is described as "... if for a given effect, both a plausible inhibitory cause and a plausible facilitative cause are present, the role of the facilitative cause in producing the effect will be judged greater than if it alone were present as a plausible cause for the effect" (p. 12). In short, the facilitative cause is seen as more powerful since it was effective in spite of the presence of inhibitory forces.

The augmentation principle can be illustrated using, as an example, the same drug ingestion experiment (Berglas & Jones, 1978) employed to illustrate the discounting principle. If the subject in that paradigm had ingested the performance
debilitating drug and then performed well, rather than poorly, the likely conclusion reached by attributors would be quite different. Rather than discounting low ability as a causal factor, most attributors would credit the subject with increased (augmented) ability. The attributor would view the subject as more able because the success occurred in spite of obstacles that he or she supposedly faced. In augmentation, then, the additional cause does not add ambiguity to the attributional task. Instead, it adds clarity to the causal importance of the identified facilitative cause.

It appears from this discussion and from these examples that self-handicapping takes advantage of both the discounting and the augmentation principles concurrently. By embracing an impediment to performance, the self-handicapper has "covered all bases." If he or she performs poorly, personal attributes such as low ability can be discounted based on the inhibitory factors. If, by contrast, he or she performs well, positive personal attributes are judged to be augmented because the individual is perceived to have performed well in spite of the impediments. The self-handicapper, then, is protected from the negative consequences of potential poor performance at the same time that the positive sequelae of performing well are maximized.

The Self-Protective Functions of Self-handicapping

Past research has demonstrated that threats to self-esteem and to social-esteem are antecedents to self-handicapping. It is possible, however, that these threats are situations that stimulate the same essential and underlying individual need: a need to maintain the integrity of the self and to protect it from loss. Returning for a moment to a basic description of self-handicapping, it has been stated that self-handicapping is a behavior undertaken for self-protective purposes. In fact Jones and Berglas (1978)
stated in their original formulation that self-handicapping is a defensive maneuver engaged in an attempt to protect one's sense of competence. Other authors (e.g. Kolditz & Arkin, 1982) have contended that self-handicapping is motivated by a desire to protect one's social image. Regardless of the suggested origin of need, individual or interpersonal, it could be argued that a situation that is likely to elicit self-handicapping is one that stimulates the need to protect and defend self-esteem and/or social-esteem from a threatened loss.

Kahneman and Tversky (1984) proposed the concept of "loss aversion" to describe the actions of individuals who prefer to minimize their losses rather than taking the risk of changing the status quo and seeking a potential gain. The determining factor in loss averse behaviors appears to be the manner in which the problem is framed by the individual. According to a number of studies conducted by Kahneman and Tversky (1984), identical problems can be framed either as potential for losses or gains relative to the status quo. For example, in a gambling situation, the "gamble" can be described in terms of what could be won or what could be lost, while maintaining the same consequences and objective probabilities of each. According to the authors, rational decision making demands "invariance," the requirement that a preference between two prospects "should not depend on the manner in which they are described" (p. 343). However, "the moral... is disturbing: Invariance is normatively essential, intuitively compelling, and psychologically unfeasible" (p. 344). That is, when framed as a risk or loss situation, individuals act in a way that suggests that they are more worried about the risk of loss than they are excited by the prospect of gain; they act with caution and conservatism.
The concept of loss aversion was proposed to describe some types of cautious consumer behaviors but it can be applied to any behavior that results when people are faced with decisions between possible acquisition and possible cost. Kahneman and Tversky suggested that the context of the decision is not important; the same decision making processes would characterize a person's choice to take an umbrella, accept a risky gamble, make consumer decisions, or go to war.

Loss of social approval is one type of significant personal loss that has been delineated in the self-presentation literature. In contrast to previous discussions of self-presentation that have suggested "that the desire for social approval underlies the preponderance of interaction goals" (Arkin, 1981, p. 312), Arkin posited that there is a second form of self-presentation, one that is "characterized by the desire to avoid significant losses in social approval" (p. 314). Arkin termed the traditionally recognized style, with its goal of social approval, "acquisitive" self-presentation. The second form of impression management, with its goal of avoiding disapproval, he termed "protective" self-presentation.

To make Arkin's distinction clear, it is important to note that acquisitive individuals, in their social interactions, would be expected to act quite differently than protective individuals. The acquisitive person should act in an approach mode, viewing the world as possessing valuable rewards that can be attained through social interaction. The protective individual, on the other hand, would be more defensive, operating in an avoidance mode and viewing the world as a threatening place, with dangers to be avoided or escaped.
Kahneman and Tversky's (1984) description of loss aversion may be an intrapsychic analog to Arkin's protective self-presentation style. It seems possible to characterize people in both their interpersonal and intrapsychic actions as either acquisitive or protective. This distinction may be quite useful in understanding both the behavior of self-handicapping and its antecedent motivations. Self-handicapping is a behavior that could best be described as protective rather than acquisitive. It could be contended that situations leading people to feel defensive about their abilities and that focus them on the potential for loss (e.g. loss of self-esteem and/or loss of public esteem) would be most likely to precipitate the choice to self-handicap.

Specifically, it has been suggested that self-handicapping serves both augmentation and discounting functions for the individual. However, it is possible that the source of the desire to self-handicap is the desire to diminish personal responsibility when performance is likely to fall short of expectations. This reduction of responsibility serves to get the self-handicapper "off the hook," so to speak. The "hook," in this case, may either be one of having to suffer a loss in his or her sense of personal esteem or one of having to endure a derisive or demeaning evaluation from others. This is not to deny that self-handicapping can offer the positive consequences of augmentation; it is only to propose that augmentation is not a primary motivator.

To amplify, if performance is by chance successful, the individual has gained. But these gains are more likely incidental, or secondary to the need to protect oneself. In fact, tentative evidence for the lack of augmentation (as a prime motivator) can be inferred from the relatively small number of subjects who choose to self-handicap
under contingent success conditions (e.g. Berglas & Jones, 1978). That is, if self-handicapping served an acquisitive function, then individuals who expect to perform well in the future, and who have confidence in their abilities, would be expected to use self-handicapping strategies to enhance attributions of ability. Because this augmentation has not been supported in the literature, and because discounting functions have been documented consistently, it is likely that self-handicapping represents an effort to protect one's self-image or public-image from anticipated negative evaluation and consequences.

Many of the experimental manipulations used by researchers to promote self-handicapping behavior have been attempts to increase subjects' feelings of uncertainty. For example, in the original paradigm (Berglas & Jones, 1978), subjects were exposed to noncontingent success feedback, ostensibly to increase feelings of uncertainty. In other studies (e.g. Snyder & Smith, 1982), subjects engaged in performance tasks that were rigged such that the subject could only complete a moderate number of problems. These manipulations also have been used to heighten the individual's subjective experience of uncertainty. Thus, in many self-handicapping studies, subjects were confronted with situations that ostensibly led them to doubt their ability to perform successfully on an anticipated test of some ability. Self-handicapping was a means by which these individuals acted to protect their public or private images of competence.

It is possible, however, that the procedures utilized to engender uncertainty (and to promote self-handicapping) are somewhat ambiguous in nature. Characterizing the phenomenology of subjects as "uncertain" seems reasonable. It is also plausible,
though, that subjects also experienced a heightened awareness of the possibility of failure and became attentionally focused on it. Specifically, in studies that used unsolvable test items, during the task performance and before the subject received any contingent or noncontingent feedback, the individual may have developed a cost-orientation. These individuals likely recognized that they did not know the answers to many questions and felt as though they were failing as they proceeded from one item to the next. Additionally, the penalty for guessing used to increase subjects' uncertainty in the Berglas and Jones (1987) experiment may have made the possibility of failure, or poor performance, more salient to subjects in those conditions. Thus, the uncertainty promoted by many of the experimental manipulations may have been confounded with a cost-orientation.

It is proposed in this paper that uncertainty is not the sole antecedent to self-handicapping. Rather there are two conditions that may be identified in previous literature as leading subjects to feel defensive about their abilities or to fear the loss of self-esteem or of public disapprobation. These are: [1] a situation in which the potential self-handicapper is led to feel a great deal of personal uncertainty about the adequacy of his or her abilities and [2] circumstances in which he or she is focused on the potential for failure (in which failure is more salient than the potential for achievement). Further, it is contended that the combination of these two conditions offers the context that is most likely to elicit self-handicapping behaviors.

**UNCERTAINTY**

Self-handicapping theory posits that individuals attempt to maintain uncertainty or ambiguity about their abilities. Thus, studies have attempted to create uncertainty
(regarding competence or ability to repeat a successful performance) as a precipitating condition to self-handicapping. Although it is plausible that uncertainty is one necessary condition for self-handicapping to occur, it is unlikely that the experience of uncertainty is the lone sufficient antecedent. Indeed, it is a popular psychological idea, supported by a body of research, that people are motivated to reduce uncertainty in their lives rather than sustain it.

An Historical Perspective

Festinger's theory of social comparison processes (1954), for example, posits that people seek to reduce ambiguity or uncertainty about the correctness of their opinions and the extent of their capabilities. The theory suggests that people are motivated to reduce their uncertainty by seeking objective evaluations of their opinions and abilities. To the extent that this objective confirmation is not available, people will engage in social comparison with others. Attribution theory (Heider, 1958; Kelley, 1972) has suggested that individuals are driven to make accurate and stable attributions about their environments and themselves in order to make their world more predictable and controllable.

In support of the theoretical notion that people seek accuracy (and attempt to reduce uncertainty), Trope and Brickman (1975) found that people actively seek accurate information about their own capacities. According to the authors, previous research in the domains of achievement motivation and information theory had contended that individuals prefer tasks of intermediate difficulty due to the high incentive value and the high informational value of these tasks, respectively. However, Trope and Brickman (1975) argued that it is "incorrect... merely to
assume" that intermediate difficulty tasks are more informative about a person's ability than tasks of low or high difficulty. Their investigation sought to unconfound the variables of difficulty and diagnosticity and to verify that the demonstrated preference people show for tasks of intermediate difficulty is attributable to the assumed diagnostic information that these tasks contain.

Subjects were allowed to select the items that they would complete on a test supposedly measuring the "integrative orientation" of the subject. They chose among test items described as easy, moderate, and difficult in each of the experimental conditions. For each difficulty level, some of the tasks were described as high in diagnostic value while the other tasks were described as low in diagnostic value. Results indicated that the stated diagnosticity of the items was the critical element in subjects' choice of test items. Rather than selecting tasks of intermediate difficulty in all situations, as had been suggested by previous research, subjects only selected intermediate difficulty tasks when these were associated with high diagnosticity. When high diagnosticity was associated with low or high difficulty tasks, these tasks were selected by subjects. That is, subjects selected highly diagnostic items regardless of the stated difficulty level. Results suggested that subjects were seeking to acquire diagnostic information about their abilities rather than to increase the expected value of success. The diagnosticity then, rather than task difficulty, was the primary determinant of the subjects' choices.

In contrast to the documented affinity for diagnostic or accurate information, there is evidence that some individuals will actively avoid diagnostic information and maintain their uncertainty. For instance, Weiner, et al. (1971) found that "individuals
low in achievement motivation prefer to avoid feedback concerning their relative abilities and select activities that are likely to result in task attributions" (p. 110).

There are situational contexts that appear to elicit information avoidance behavior. The relationship between noncontingent success and the avoidance of diagnostic information has been explored. Sachs (1982) used a noncontingent success paradigm, similar to that used in self-handicapping studies, with an item selection dependent measure, like that used by Trope (1975). The results indicated that subjects in the contingent success conditions preferred test items of high diagnostic value. Noncontingent success condition subjects, however, showed a preference for items of low diagnosticity. Thus, there is support for the contention that noncontingent success will lead to an avoidance of accurate or diagnostic ability feedback.

**Uncertainty and Self-Handicapping**

Jones and Berglas (1978; Berglas & Jones, 1978) suggested that self-handicapping is an ambiguity seeking, diagnosis avoiding behavior that results from situational demands on the subject. They proposed that subjects who are made to feel uncertain of their abilities to perform on a task would choose a performance context that increases attributional ambiguity. Thus, uncertainty was proposed to be the antecedent condition that motivates this self-protective behavior. A number of studies have offered conceptual and experimental support for such a notion (e.g. Snyder & Smith, 1982). Using noncontingent success and task difficulty to elicit feelings of "anxious uncertainty" concerning one's competencies, researchers have evoked self-handicapping behaviors and explained these behaviors as reactions to this manipulated uncertainty.
Although noncontingent success and high task difficulty appear to be successful in precipitating avoidance of diagnostic information, it is not at all clear that these manipulations constitute conditions that could be characterized purely as "uncertainty" alone. Indeed, although noncontingent success and test difficulty do appear to evoke uncertainty in subjects, these manipulations may be confounded by inadvertently stimulating a cost-orientation as well. Thus, it is unclear whether subjects' uncertainty, cost-orientation, or a combination of the two is responsible for eliciting self-handicapping behavior.

**COST-ORIENTATION**

In the past, researchers have speculated that uncertainty may not be the only necessary precipitant to self-handicapping (e.g. Kolditz, 1986). Kolditz, for example, explored the influence of outcome-salience on subsequent self-handicapping. He expanded on the Berglas and Jones (1978) "penalty for guessing" manipulation by developing a methodology with which subjects received either "success-salient" or "failure-salient" instructions. Strongly related to outcome-salience is the concept of reward and cost orientation. In addition to subjects' uncertainty, then, it is contended that a second element potentially precipitating self-handicapping is the formation of a cost-orientation.

**An Historical Perspective**

Based on Thibaut and Kelley's discussion of reward and cost oriented people, Canavan-Gumpert (1977), in trait-like terms, described cost and reward oriented people as analogous to pessimists and optimists, respectively. Like pessimists,
cost-oriented people have been described as attending to costs and losses. For these people, failures are more salient than successes and losses are more salient than gains. They have been characterized as feeling powerless, fearing failure, minimizing risks, performing poorly, and expecting poor performance (Canavan-Gumpert, 1977). With this perspective, cost-oriented individuals should be prone to focus on costs and, as a result, should have a heightened awareness of the prospect of losing. Canavan-Gumpert conducted an experiment which suggested that cost and reward orientation could be initiated situationally, among her young subjects, by criticizing failures or by praising successes, respectively.

Children participated in a two-part experiment. During the first part, they performed a 20 item "decoding" task. For the first group of children, the experimenter attempted to create a reward-orientation by praising correct responses and ignoring incorrect responses. For a second group of children, incorrect responses were criticized and correct responses were ignored, as an induction of cost-orientation. Two control groups were included in the design, one that received both praise for success and criticism for failure, the other received neither.

Results suggested that these procedures did, in fact, induce the expected reward and cost orientations. Children in the reward condition perceived their practice session performance more favorably, developed higher expectations for future performance, and indeed performed better on subsequent tasks than children in the cost condition. More important for the present research is the finding that children in the reward-orientation condition became more risk-taking than the cost-oriented children. Specifically, when given the opportunity to select future tasks, children in the praise
success condition chose the items with the highest difficulty levels while children in the criticize failure condition chose items with the lowest difficulty ratings.

Canavan-Gumpert's (1977) study of fifth and sixth grade school children demonstrated that reward and cost orientations can be initiated through praise and criticism. Reward-oriented persons were described as optimists, as confident, and as success-oriented. She suggested that these people perceived successes as more salient than failures. Cost-oriented individuals were described as pessimistic, fearful of failure, and particularly aware of the cost contingencies of events. This study showed that reward and cost orientations could be induced through methods of socializing children, such as praising successes or criticizing failures, respectively. Further, the study demonstrated the power of situational variables in creating a subject's frame of reference when confronting a task.

**Cost-Orientation and Self-Handicapping**

Cost orientation may have been a factor in self-handicapping studies. Many of the studies manipulated subjects' expectations for future performance by making success seem unlikely. Indeed, the procedures may inadvertently have focused subjects' attention on the prospect of failure. In noncontingent success situations, for example, even though the experimenters did not intend such consequences, the subjects were likely to have recognized their inability to solve each successive problem. The noncontingent success conditions involved a sequence of problems that were essentially unsolvable. Subjects attempting this succession of unsolvable items may have developed an increasing awareness of failure. Thus, before such subjects were ever offered the noncontingent success feedback, they may have become oriented
toward failure, which in turn may have elicited an awareness that loss may be imminent. Similarly, studies that attempted to increase uncertainty by presenting subjects with very difficult or unsolvable problems may have focused subjects' attention on failures and induced a cost-orientation.

Further, in the original Berglas and Jones (1978) study, the experimenter gave one instruction to the subjects that may have heightened their expectations for failure and loss. Specifically, subjects were instructed that the scoring on the post-drug-ingestion intellectual performance test would be modified such that incorrect responses to questions would be penalized. The experimenters were attempting to exacerbate the concern that the subjects felt about their abilities to perform the impending task. However, this procedure inadvertently may have induced a cost-orientation that focused subjects' attention on the prospect of loss. Their instruction called subjects' attention to the possibility of failed trials and penalties for failure. For these subjects, consequences for failure may have been more salient than the possibilities of achieving excellence.

Many of the self-handicapping studies manipulated subjects expectations for future performance by making success seem unlikely. The manipulations may have focused the subjects' attention on to the prospect of failure, which in turn may have elicited a need for personal protection. Thus, some of the manipulations in self-handicapping studies may have encouraged subjects to act in a protective, non-risk taking manner in response to experimental instructions that may have generated a cost orientation.
Overview of the Present Study

It is proposed that self-handicapping is a response to situations that lead people to feel defensive, or protective about their abilities. Past research has attempted to elicit self-handicapping by exposing subjects to conditions that would make them feel uncertain about their abilities. However, the manipulations used to increase uncertainty may have inadvertently focused subjects' attention on the prospect of failure, made failure outcomes more salient than successes, or created a cost-orientation. In particular, the present study was designed to unconfound the conditions of uncertainty and cost-orientation and to explore the respective roles of these two variables in eliciting self-handicapping behavior.

The current study explored the roles of cost orientation and uncertainty as predictors of self-handicapping behavior. It was suggested that the experience of uncertainty may lead subjects to feel either protective or acquisitive. Specifically, subjects who are both uncertain and cost-oriented are likely to feel protective, while subjects who are uncertain but reward-oriented are likely to feel acquisitive. In the present study, it was the subjects who were made to feel protective who were expected to self-handicap when anticipating a performance evaluation. Thus, subjects who were made to feel uncertain of their competencies and who found cost more salient than reward were predicted to be most likely to engage in self-handicapping behavior. Further, these subjects were expected to attribute performance externally and to avoid diagnostic information.

More tentatively, it was predicted that subjects who were exposed to uncertainty conditions but who were reward-oriented would act in an acquisitive manner, seeking
to excel on the subsequent evaluation task. That is, these subjects were expected to construe the anticipated evaluation as a challenge and as an opportunity to test their excellence. They were expected to exert more effort to attain the best possible score on the test. Additionally, they were expected to make internal attributions for performance and to seek diagnostic information.

Assuming that the goal of self-handicapping is the establishment and/or maintenance of causal ambiguity, then individuals who are made to feel certain of their level of competence should lack the motivation to self-handicap. Specifically, subjects who were made to feel certain about their level of ability, regardless of their cost or reward orientation, should eschew self-handicapping options. These subjects were expected to feel that they had obtained accurate information about their abilities and, therefore, had nothing to gain by self-handicapping or by engaging in additional acquisitive behavior.
METHOD

Subjects: Subjects were 90 male and 90 female introductory psychology students at The Ohio State University who participated as partial fulfillment of a course requirement. Subjects were solicited for a study ostensibly concerned with compiling normative information for a standardized test, the "Verbal Reasoning Association Test" or "V-RAT," a test of a newly defined competence called "Integrative Orientation." Subjects were randomly assigned to the nine experimental conditions with ten males and ten females per condition. Data from nine additional subjects were eliminated from the analyses: five subjects were excluded because they had been informed by friends that there was no final test; an additional four subjects' data were eliminated because they failed to follow instructions.

Procedure: Subjects participated individually in experimental sessions that lasted approximately one hour. Upon arriving for the experiment, subjects were greeted by a female experimenter, led into a private room, and seated in front of a computer. The computer screen showed the opening display stating:

VERBAL REASONING ASSOCIATION TEST
Administration Program
Version 3.0
(Strike any key to continue.)

Similar to the procedures of Trope and Brickman (1975), subjects were told that they were participating in a national study designed to collect local norms for the Verbal
Reasoning Association Test (V-RAT), a test of "Integrative Orientation." Integrative Orientation was described as a capacity associated with creative problem solving, and related to the ability to process and integrate verbal information, to abstract and generalize, to learn from and to use information, and to find new solutions to problems. To discourage subjects from inferring their level of integrative orientation based on past experience and accomplishment, the experimenter emphasized that Integrative Orientation is not accurately measured by standard intelligence tests and is not correlated with academic performance. This was underscored by explaining that in the national study, test scores at each university were normally distributed with half of the students at each university scoring high and half scoring low on the V-RAT. Thus, subjects were led to feel that Integrative Orientation was a desirable capacity and that their academic record or intelligence level were not predictive of their ability at this newly defined capacity.

The experimenter then explained that the final test would be scored by the computer at the end of the hour and that the subject would have the opportunity to review and discuss the results with the experimenter. Thus, subjects expected to be apprised of their performance results and expected this feedback to be public.

Finally, the value of practice was described to the subject. Subjects were informed that the final test was a 10-minute timed test and that it would be administered on the computer after the subject had completed two computerized practice tests that had no time constraints. Subjects were told that practicing could be advantageous in attaining the best possible V-RAT score and that each practice test would focus on a different aspect of Integrative Orientation. They were led to believe
that the final test would reflect a combination of the skills contained in the two practice tests. Following the procedure of Harris and Snyder (1986), subjects were told that "just as athletes perform better after warming up, you should do better on this test if you practice and 'warm up' with the practice tests."

After checking that the subjects understood the instructions and the procedures, they were instructed to "strike a key" to advance the computer to the next screen. The second screen was a "function menu," designed to add to the credibility of the cover story. It also offered a brief review of the procedures (See Appendix B). Six "test functions" were listed with their accompanying "code" numbers. The functions were: 1. Practice Test I; 2. Practice Test II; 3. Test Form - Individual; 4. Test Form - Group; 5. Score Analysis; 0. End Program. The experimenter explained each option, emphasizing that the procedure called for two practice tests, a final test, and a final score analysis and review.

The subject was then asked to enter Option 1, Practice Test I. Subjects were prompted by the computer to enter their "subject numbers" (provided by the experimenter), age, and gender. Subject numbers ranged from 100 to 399. The computer was programmed such that this subject number triggered the appropriate Reward or Cost Orientation feedback during Practice Test I. This procedure was designed so that the Reward and Cost orientation feedback would be computer generated, and therefore less suspicious.

Subjects were informed that the first practice test would be administered by the computer and would consist of 25 analogy problems. For subjects in the Reward or Cost Orientation conditions, the experimenter explained that the computer would
provide "periodic feedback" on performance. Specifically, the experimenter explained that the computer "is programmed to spot check your answers randomly" and that subject should expect four or five feedback messages during the first practice test. The experimenter then left the room, explaining that the subject should notify her in the next room when the first practice test was completed.

Subjects were left alone to complete the first practice test. The computer program offered a definition and explanation of analogy problems followed by an example and an explanation of the correct answer to the sample problem. Subjects were then prompted by the computer to indicate whether or not they understood the directions and the task demands. For those who indicated an understanding, the program advanced to the first practice test problem. For subjects who indicated that they did not understand the instructions and example, a second sample problem was provided, complete with explanation and correct answer. After the second sample, the computer automatically advanced to the practice test.

Practice Test I consisted of 25 analogy problems. Each problem began with two capitalized words that were related to each other in some way. This word pair was followed by five pairs of words from which the subject selected the pair in which the two words were related to each other in the same manner as the original two words. Thus, for example, the test items were presented in the following format: SNAPSHOT : SCRAPBOOK:: 1. memo : file, 2. photograph : book jacket, 3. camera : case, 4. film : frame, 5. career : portfolio. To insure equivalence of groups, the computer was programmed to calculate continually each subject's percentage of correct answers and then to select items according to difficulty level so that all subjects
would achieve approximately the same final score on the first practice test. Thus, it was intended that when the first practice test was completed, subjects in each group would have the same general sense of accomplishment; subjects who were particularly facile with analogy problems would receive more difficult items, subjects without such facility would receive easier problems, but all subjects would attain approximately the same score.

**Manipulations of Reward and Cost Orientation:**

The manipulation of Cost and Reward Orientation was achieved through a two-step procedure. That is, Reward and Cost Orientation feedback was embedded in the computer program for the first practice test and was then reinforced in a subsequent thought-listing task.

The general procedure developed to evoke Reward and Cost Orientations from subjects in the current study was inspired by the methods developed by Canavan-Gumpert (1977). In both studies, praise for success was offered to Reward oriented subjects in an attempt to focus the subjects' attention on positive consequences and successes; criticism of failure was given to Cost oriented subjects, thus directing their attention toward their failures. In the present study, this feedback was delivered by the computer.

**Computer Generated Reward Salient Feedback:** For subjects in the Reward Orientation conditions, the first practice test began with the message: "Do your best to get the right answers." After this optimistic message, subjects began to work the analogy problems. They received feedback in response to four items on the test. On three successful trials, the computer offered high praise. On one failed trial, subjects
received a weak version of criticism. Specifically, the first, third, and fourth feedback messages presented to these subjects stated in very large, and bold-face letters, "Right! Keep up the good work!" The second feedback message stated simply, "Incorrect answer."

Cost Salient Feedback: For subjects in the Cost Orientation conditions, the first practice test began with the message, "Do your best to avoid mistakes." After this cost-focussed message, subjects began to work the analogy problems. They received feedback in response to four items on the test. On three failed trials, the computer offered a strong version of criticism. On one successful trial, the computer mildly praised the subject. The first, third, and fourth feedback messages presented to these subjects stated in very large, and bold-face letters, "Wrong! Please be more careful to avoid errors" The second feedback message stated simply, "Correct answer."

Thought Listing: Explanations for Hypothetical Performance Results

After the pretest had been administered, subjects received an additional cost/reward orientation induction that generally followed the methodology of Sherman, et al (1981). Subjects were asked to explain the causes of hypothetical failure or success prior to performing the "final" version of the task.

Specifically, after completing the first practice test, the computer instructed the subjects to, "Please get the experimenter." Upon entering the lab, the experimenter explained that, in addition to collecting local norms for the V-RAT, the study was also concerned with determining how people come to explain and understand their own performances and behaviors. In order to pursue this research aim, subjects were asked to imagine having done exceptionally well (Reward orientation) or exceptionally
poorly (Cost Orientation) on the final V-RAT. The experimenter attempted to create a mental image for the subject by reading a scenario that suggested the desired performance results for the subjects. "...before we continue, I would like you to take a minute to imagine that you have just completed the V-RAT. Of course we do not yet know enough to predict how well you are going to do on the test, but we want you to imagine that you have just done very well (very poorly) on the test." The experimenter continued the explanation by encouraging the subject to "...try to imagine this as vividly as you can. Make it as realistic as you can. Imagine that you have already taken the final 10-minute timed test and that you got a really high (low) score. Imagine that I came in to the room and we checked on the score analysis and saw this really great (bad) score and then we checked the subscores and you did really well (poorly) on all of those, too." Subjects were then reminded to imagine the scenario vividly and realistically.

After this image was created and made salient, the experimenter instructed subjects to write down explanations for the hypothetical success or failure. The subject was told to use only dispositional attributions for the performance outcome, to list at least five attributional statements, and to keep working for at least five minutes. Specifically, subjects were told "I want the explanations to be something personal about you. Think of who you are and what kind of a person you are, your personal characteristics and your personal qualities, and then use those traits to explain why you did so well (poorly). For example, you could use the words 'I am.' You could say, 'I did so well (poorly) because I am whatever' or '... I am a whatever kind of person.' And fill in a trait or quality." Subjects were again reminded that they should
use "personal characteristics" as explanations, that they should continue to imagine the success (failure) vividly, that they needed to complete at least five separate explanations for the hypothetical results, and that they must work on the task for five minutes.

The expected effect of this procedure was that subjects' orientation toward reward or cost would be strengthened due to the five minute focus on either positive (Reward) or negative (Cost) aspects and potential outcomes. Additionally, the task of generating dispositional attributions for the hypothetical outcome was expected to encourage subjects to consider the possibility that the hypothetical outcome could become real and that the outcome could be the result of something about the subject (e.g. ability or lack of ability). Finally, it was important to focus the attributions inward so that the task of explaining outcomes would not become an opportunity for subjects in the cost conditions to externalize their attributions for failure and thus obviate the need to self-handicap. It should be noted that pretesting suggested that subjects not encouraged to make dispositional attributions tended to attribute outcomes (especially negative outcomes) to situational factors.

**Interpolated task:** Subjects in the control condition, who did not receive reward or cost salient feedback, were told that a short break was necessary between the practice tests, and were asked to fill out a questionnaire, the "Student Interest Battery," during this interim. On the SIB, subjects were instructed to list their three favorite things to do in the city, favorite foods, T.V. shows, sports and sporting events, and musical groups or musicians.
Manipulations of Certainty and Uncertainty:

After the five minute thought listing task, the experimenter entered the room holding the "V-RAT Interpretation Manual," a several hundred page manual prepared for the present study. The manual appeared to contain instructional chapters to aid the experimenter in interpreting test results, as well as tables of norms, frequencies, etc., and graphs of standard, or expected patterns of response.

The experimenter explained that, before continuing on to the second practice test, it was possible to analyze the subject's pattern of responding and thus to determine how accurate the results were so far. It was explained that "everybody approaches problems differently... and we are able to look at your style of approaching integrative orientation problems." The experimenter continued by explaining that the computer would calculate the subject's "Surgency Profile," which would indicate his or her style of approaching the problems. The numbers that comprise the Surgency Profile would then be matched to a profile diagram in the Interpretation Manual. Subjects were told that "Everybody fits one pattern or another," and that "the closer that your numbers fit to one of the profiles, the more interpretable your results are, and the more confident we are of the interpretation and the accuracy of your scores. Do you understand? The closer your numbers fit, the more accurate your results are; it has nothing to do with how well or poorly you did, only with how accurate your results are."

The experimenter then described the procedure. Specifically, it was explained that the computer would calculate five "critical factors," from the first practice test results, and that some of the numbers were supposed to be high and some were
supposed to be low. Subjects were led to believe that the magnitude of the numbers did not matter, it only mattered that the pattern fit one of the patterns graphed in the interpretation manual. Finally, the experimenter explained that the computer would star one or two factors to indicate visually which surgency pattern to check in the manual.

**Uncertainty:** Subjects in Uncertain conditions were told that the computer program could star only one of the critical factors. When the numbers appeared, the computer starred both factor A and factor C. The experimenter responded with surprise stating, "That's strange. I've never seen that before! You have two surgency scales!! See the starred scales? Those are your surgency scales. There's only supposed to be one. I've never seen anybody get two surgency scales before. I didn't even know that could happen. I'm not even sure how to look it up." The experimenter then began to try to look up the appropriate profile. "One star on A usually represents Uni-Kronic Surgency. And two stars on C is usually Di-Tryptic. Well, it has to be one of them." Subjects watched as the experimenter first attempted to match the numbers to the one-star Uni-Kronic pattern, and then to the two-star Di-Tryptic pattern. Finally, the experimenter, stated her confusion, said that maybe she was mistaken about the two-star pattern, and thus turned to the two-star Di-Kronic pattern. After looking at these graphs, and paging through one additional graph, the experimenter apologized to the subject, explaining that there has been a problem with that part of the computer program and that perhaps it was a computer error. The experimenter reassured the subject that an independent analysis could be run on the final V-RAT, but unfortunately, "I really can't tell you what this means or what your
surgency scales are. . . I guess we can't give you any information about your performance on the first practice test. I can't tell you anything about your score or about the accuracy of the results." Thus, subjects in the Uncertain conditions were left with no practice test score, and without any of the feedback or accuracy information that they had expected.

Certainty: Subjects in the Certain conditions received the same instructions and explanations as did subjects in the Uncertain conditions. However, Certain subjects were told that the computer would list their practice test score and would also place one or two stars next to two of the Critical Factors. The experimenter reassured subjects that the score was just part of the Surgency calculation and thus is not an important indication or prediction of ability. When the stars appeared on Factors A and C, the experimenter explained that the stars are added together. Thus the subject had attained a three star, or Tri-tryptic Surgency Profile. The experimenter paged through the manual, showing the Uni-Kronic and Di-Tryptic patterns to the subject before turning to the Tri-Tryptic page. The experimenter called out the computer numbers as she matched them to the profile sheet. The match was nearly perfect. "The closer you are, the more accurate your results are. . . That's really close. You see, everybody fits one pattern or another. . . Your pattern is so close, we will get a really accurate analysis of your final results."

Dependent Measures:

Three waves of measures were included in the study. First, a questionnaire was administered after subjects completed the first practice test and the certainty instructions were delivered. The measures included on this questionnaire were
designed primarily as a manipulation check of Reward and Cost orientation and level of certainty. The primary dependent variable, the amount of practice in which the subjects engaged, was assessed in the form of a second practice test. Thus, after completing the interim questionnaire, subjects were asked to practice for the final test, and the amount of practice was measured. Finally, a questionnaire was administered at the conclusion of the experiment. This questionnaire was designed to explore some subsidiary hypotheses of the study.

**Interim Questionnaire I:** After completing all manipulations, and before continuing to the second practice test (main dependent measure), subjects in all groups filled out a brief questionnaire (Appendix C). This questionnaire contained eight items, anchored on Likert type scales, designed to assess the success of each experimental manipulation. Thus there were questions measuring subjects' cost orientation and reward orientation, certainty and uncertainty.

**Main Dependent Measure: The Second Practice Test:** After completing the first questionnaire, subjects called the experimenter back into the lab and the experimenter offered a description of the second practice test. The description of this test was designed to re-emphasize the importance of practice in attaining the best possible score on the final test, as well as to emphasize that skills developed during the second practice test were related to, yet independent of those practiced on the first practice test.

In the instructions, subjects were informed that they would, "be allowed to practice as much or as little as you like. The more you practice on this test, the better your V-RAT score should be. On this test, you will be solving analogies again. But this time, the rules underlying the analogies will be different. And the analogies will
be in a different form. Just like the last set of analogies, you will begin to learn the rules as you practice with this set of problems. Thus, although these problems are still analogies, the logic behind them, and the relationships that they test are different than the last practice test. Again, remember that practice, or "warming up" should help you to score better on the V-RAT. Just like athletes warm up before a big meet or game, we'd like you to spend as much or as little time as you would like warming up before you take the final test . . . The computer will give you instructions for this practice test, and for how to stop when you feel ready for the final V-RAT. So, go ahead and solve as many or as few problems as you like."

Subjects were then left alone in the room to work the practice problems on the computer. The analogies on the second practice test were presented in a different format than analogies on the first practice test. Specifically, instead of being presented with a two-word cue, followed by five numbered word pairs from which to select the analogous answer, in this practice test, subjects were presented with a three word cue, followed by four numbered words from which to select the appropriate single word to complete the analogy. For example, then, the test items were presented in the following format: SNAPSHOT: SCRAPBOOK: MEMO:: 1. file, 2. photograph, 3. camera, 4. film. Subjects were allowed to practice as long as they desired. As they practiced, the computer compiled both the number of problems attempted and the amount of time (to the hundredth of a second) that the subject pursued the practice task.

**Final Questionnaire:** A final questionnaire contained dependent measures of a secondary nature (see Appendix C). First, subjects were asked to indicate the number
of problems that they had attempted and the number of problems that they believed most people attempted. Items were also included to determine the amount of diagnostic information that subjects desired. Specifically, subjects were asked whether they would prefer their performance feedback to be a single, global score of ability or a detailed analysis (e.g. subtest scores or graphs and charts) indicating specific areas of strength and weakness, and whether or not they wanted their results presented in comparison with other students at their university. Other items assessed the type of attribution that subjects made for their performance (e.g. ability, effort, luck, task difficulty).

After subjects completed this final questionnaire, the experimenter returned and then explained that the experiment was over, and that there would be no final test. Subjects were debriefed thoroughly and dismissed.
RESULTS

Validation of Manipulations:

All measures included in order to provide evidence concerning the effectiveness of the inductions of Certainty vs. Uncertainty and Reward vs. Cost Orientation appeared as items on the Interim Questionnaire. Analyses of manipulation check items were conducted using a 2 (Sex: Male, Female) X 3 (Feedback: Reward/Cost Orientation, No Feedback) X 3 (Certainty: Certain, Uncertain, No Information) analysis of variance (ANOVA).

Manipulation of Uncertainty: Subjects indicated the degree to which they felt confident that they would perform well or poorly on the final V-RAT. This item was anchored on a 23-point scale with endpoints indicating "completely certain that I will do poorly" (-11) and "completely certain that I will do well" (+11), and with 0 labelled "completely uncertain." Results of the analysis of variance yielded the predicted main effect of Certainty, $F(1, 162) = 6.331$, $p < .002$. As expected, post hoc comparisons (Tukey's) revealed that subjects in the High Certain conditions indicated a greater level of certainty ($M = 4.17$) than the High Uncertain subjects ($M = 2.22$), $F(2, 177) = 6.00$, $p < .003$ (see Table 1). Subjects who received no certainty information reported an intermediate amount of certainty ($M = 3.03$). Thus, the certainty manipulation appeared to have been successful, with subjects in the Uncertain condition reporting the highest level of uncertainty and subjects in the Certain condition reporting the
highest level of certainty. Notably, only 6.67 percent of the subject population provided ratings on the negative side of the zero point.

Additionally, an unexpected interaction of Feedback and Certainty emerged on this measure, $F (1, 162) = 2.63, p < .04$. As can be seen in Table 1 (Appendix A), the predicted pattern of certainty ratings was qualified by the presence and absence of reward orientation. The post hoc analyses show that, for subjects in the No Feedback conditions, Certain subjects ($M = 4.50$) offered higher ratings of certainty than both Uncertain subjects ($M = 1.40$) and No Information subjects ($M = 1.50$), $F (8, 171) = 3.59, p < .001$. Also, the expected pattern of certainty ratings was obtained in the Cost Orientation and No Information conditions, as well. However, the reward orientation information appears to have undermined or neutralized the effectiveness of the uncertainty information. Perhaps the reward orienting information allowed subjects to sustain a sense of certainty and confidence in spite of the information intended to produce uncertainty.

**Manipulation of Cost and Reward Orientation:** Cost and Reward Orientations were assessed through a series of measures on the interim questionnaire. It was expected that Cost Oriented subjects would be more focused on failure and on potential errors, less concerned with the possibility of success, and less satisfied with their performance; by contrast, Reward orientated subjects were expected to be more focused on success, less concerned with failure or errors, and more satisfied with their performance than their counterparts.

On 9-point Likert type scales, subjects were asked to indicate how "pleased" they were when they got a right answer, how "gratifying" success would be on the V-RAT,
how "bothered" they were when they got a wrong answer, and how "distressing" failure would be on the V-RAT. Separate analyses of variance of each item suggested support for the induction of Reward and Cost Orientations. Table 2 (Appendix A) presents the means for all four Reward and Cost Orientation items.

Three of the measures included to explore subjects' frame of reference yielded the predicted pattern of results. Analyses of the "pleased" item revealed a significant main effect of Feedback, $F(2, 162) = 5.89, p < .003$, with post hoc analyses suggesting that Reward Orientation subjects were more pleased than No Information subjects, $F(2, 177) = 5.82, p < .004$, and slightly, though nonsignificantly, more pleased than Cost Orientation subjects. The "gratifying" item failed to reach significance. Analyses of the "bothered" item approached significance for Feedback, $F(2, 162) = 2.95, p < .055$, with post hoc analyses supporting the expectation that Cost Orientation subjects would be more bothered than No Information subjects. In general, inspection of means suggests that Reward Oriented subjects were somewhat more pleased when they got a right answer and would find success somewhat more gratifying than their Cost Oriented counterparts, and that Cost Oriented subjects were slightly more bothered by wrong answers than were Reward Oriented subjects. Interestingly, subjects in the No Feedback conditions offered the lowest ratings on each measure. In retrospect, however, this is not surprising in that these subjects had been given no indication of the correctness of their answers on the first practice test. Thus, not only did they have to infer which answers were correct or incorrect, but achievement on this practice test was likely to have been less salient to these No Feedback subjects. Put differently, feedback of any sort may produce psychological
involvement and make the affective consequences of performance both salient and consequential.

On the single item that did not conform to predictions, Reward and Cost Orientated subjects indicated that failure would be equally "distressing." The main effect of Feedback was significant, \( F(2, 162) = 6.21, p < .003 \), and an unexpected interaction of Feedback and Certainty was found, \( F(4, 162) = 2.68, p < .04 \). Inspection of the means presented in Table 2 (Appendix A) suggests that, as predicted, Cost Orientation subjects obtained the highest mean level of distress in both the Uncertain and No information conditions, but not in the Certainty conditions. Thus, perhaps Cost Orientation was induced effectively in the Uncertain and No Information conditions.

On an additional item, subjects were asked, "How satisfied are you with your performance on the first practice test?" Analysis failed to yield a significant main effect of Feedback. However, the pattern of results appears to offer some support for the effectiveness of the Reward and Cost Orientation induction. Table 3 (Appendix A) depicts the means for this measure. Inspection of the means suggest that Reward Orientation subjects were somewhat more satisfied than Cost Orientation subjects, but only in the Uncertain and No Information conditions. Once again, the effect seems to have been undermined by Certainty information, where Cost Orientation, Certain subjects expressed even more satisfaction with their performance than did their Reward Orientation or No Feedback, Certain counterparts. Additionally, an unanticipated main effect of Certainty emerged, \( F(2, 162) = 9.795, p < .01 \). Certain subjects were more satisfied than Uncertain or No Information subjects. Although not
predicted, these results are quite understandable; it has been posited consistently in the literature that uncertainty is disconcerting and should produce feelings of dissatisfaction (e.g. Festinger, 1954, Kelley 1971). Uncertain subjects were understandably less satisfied, then; while this was not true when the Uncertain subjects were also Reward Oriented, the statistical interaction was not significant.

**Equivalence of Groups:** Equivalence of groups was assessed in an effort to check that groups did not differ systematically in ways not predicted by the experimental hypotheses. Subjects' score on the first practice test was analyzed to assess equivalence of groups in terms of performance. Recall that the computer was programmed to vary the difficulty level of each Practice Test I item and to alter the test so that subjects in all conditions achieved similar scores. Analysis of variance performed on subjects' obtained score yielded only an unexpected main effect of sex, $F(2, 162) = 6.98, p < .009$. Male subjects ($M = 16.92$) achieved higher scores on the first practice test than did female subjects ($M = 16.50$). To assess equivalence in terms of phenomenological experience of ability, the Interim Questionnaire included two items. The first asked subjects to indicate, on a 9-point scale, their level of Integrative Orientation. Analyses of variance yielded no significant difference between groups. The second item asked subjects to guess, on a 25-point scale, their score on the first practice test. Analyses of variance yielded an unexpected main effect of Feedback, $F(2, 171) = 5.63, p < .005$. Post hoc analyses (Tukeys) indicated that No Feedback subjects ($M = 16.27$) endorsed a lower hypothetical score than did Reward ($M = 17.85$) or Cost ($M = 17.52$) subjects, $F(2, 177) = 5.52, p < .005$. An item on the final questionnaire asked subjects to indicate the extent to which they believed practice
to be important to their performance on the final V-RAT. As predicted, analyses of variance yielded no significant results. Finally, subjects were asked to indicate the degree to which they felt anxious during the experiment. No significant results were obtained from the analysis of variance. In sum, there were no differences between groups in the score achieved by subjects, subjective estimates of level of ability, subjective estimates of scores, subjects' understanding of the value of practice in succeeding on the final test, or their overall level of anxiety during the experiment. Thus, subjects were equivalent in actual and perceived performance and ability, understanding of the value of practice, and level of anxiety, and these variables may be eliminated as potential confounds to the experimental findings.

Summary of manipulation checks:

By way of review, it appears clear that the phenomenology necessary to test the predictions of this study was created successfully. Essential was the creation of a Cost/Uncertain condition that was demonstrably more cost-oriented and more uncertain than comparison groups. Manipulation check measures indicate consistently that the necessary frame of reference was induced, and that Cost/Uncertain subjects were at least somewhat more uncertain, less pleased, less gratified, more bothered, more distressed, and less satisfied than subjects in the other conditions. Conditions necessary to create the Reward/Uncertain condition were not met as reliably. In sum, the stage was set to test the hypotheses relevant to self-handicapping of Cost/Uncertain subjects, but conditions were not met as stringently to test the predictions that Reward/Uncertain subjects would act acquisitively.
PRIMARY ANALYSES: ACQUIRED AND CLAIMED SELF-HANDICAPPING

The main dependent variables in the current study were the number of practice problems attempted, the amount of time that subjects spent practicing, and the number of practice problems that the subjects claimed to have attempted. For each of these measures, self-handicapping was operationalized as a reduction in the amount practiced (or amount of practice claimed). It was predicted that subjects in the Cost/Uncertain condition would self-handicap more than subjects in any other condition. Accordingly, the primary analysis of the self-handicapping data consisted of a planned contrast that tested the specific pattern of means predicted by our hypothesis. That is, we expected subjects in the Cost/Uncertain condition (given a weight of -3) to practice less than subjects in the Reward/Certain, Reward/Uncertain, and Cost/Certain conditions (each given a weight of +1). Subsequent sections of this paper will discuss the findings relevant to the acquisitiveness (increase in effort) of the Reward/Uncertain subjects, and will further explore the self-handicapping and acquisitiveness of subjects as indicated by secondary measures.

Acquired Self-Handicapping: The primary measure of acquired self-handicapping was the number of problems attempted by subjects on the "second practice test." The contrast, in which Cost/Uncertain subjects were expected to practice less than Reward/Certain, Reward/Uncertain, and Cost/Certain subjects, proved significant, $T(1, 76) = 3.996, p < .001$. As can be seen in Table 4 (Appendix A), Cost/Uncertain subjects ($M = 17.85$) attempted significantly fewer problems than did subjects collectively and individually ($ps < .01$) in the other three conditions ($M = 31.38$), providing clear support for the self-handicapping prediction.
As a second measure of acquired self-handicapping, the total amount of time devoted to the second practice test was recorded (by the computer). The planned comparison of this measure was also significant, $T(1, 76) = 3.13, p < .002$. Similar to the pattern of results from the measure of number of problems attempted, Cost/Uncertain subjects practiced for shorter periods of time ($M = 427.00$ seconds) than did subjects collectively and individually ($ps < .01$) in the other three conditions ($M = 600.22$ seconds). In sum, on both measures of acquired self-handicapping, (number of problems attempted and time on task), results supported the hypotheses that Cost/Uncertain subjects would self-handicap by withdrawing effort or failing to practice for the final test.

**Claimed Self-Handicapping:** It was predicted that, in addition to creating or acquiring a handicap, subjects would also claim to have handicapped. The final questionnaire included an item asking subjects to estimate the number of problems they had attempted on the second practice test. It was predicted that Cost/Uncertain subjects would claim to have handicapped their own performance by estimating fewer problems attempted than the estimates offered by subjects in other conditions. The planned contrast on this measure yielded significant results, $T(1, 76) = 3.27, p < .002$. Cost/Uncertain subjects ($M = 16.90$) claimed to have attempted fewer problems than did subjects in the other three conditions ($M = 23.77$). Means for this measure are displayed in Table 5 (Appendix A). As expected, then, it appears that Cost/Uncertain subjects claimed to have handicapped their upcoming performance.
SECONDARY ANALYSES: ACOQUISITIVENESS

In addition to the self-handicapping predictions, it was more tentatively predicted that subjects in the Reward/Uncertain condition would act acquisitively, practicing more (and perhaps acknowledging more practice) than subjects in other conditions. One-tailed planned contrasts were used to explore this secondary hypothesis. These contrasts, orthogonal to the self-handicapping contrasts discussed above, compared the means of the Reward/Uncertain condition (weighted 2) with those of the Reward/Certain and Cost/Certain conditions (each weighted -1, with Cost/Uncertain receiving a weighting of 0). For exploratory purposes, further 2 (Sex: Male, Female) x 2 (Feedback: Reward, Cost) x 2 (Certainty: Certain, Uncertain) analyses of variance were conducted to examine the interaction of the main independent variables.

Behavioral Acquisitiveness: Analyses of the number of practice problems attempted revealed mixed results. The planned contrast yielded results that approached significance, $T(1, 76) = 1.427, p < .079$, indicating that Reward/Uncertain subjects did attempt the largest number of practice problems, but not to a conventional level of statistical significant.

However, the analysis of variance supported the stated hypotheses. Results yielded a significant main effect of Feedback, $F(1, 72) = 12.99, p < .001$; subjects in the Reward conditions ($M = 33.38$) attempted a greater number of practice problems than did subjects in the Cost conditions ($M = 22.63$). As expected, the overall effect of Certainty was not significant. The predicted Feedback-Certainty interaction did yield significant results, $F(1, 72) = 4.32, p < .05$. As can be seen in Table 4 (Appendix A), Cost/Uncertain subjects self-handicapped by attempting fewer practice
problems than other subjects and Reward/Uncertain subjects acted acquisitively, attempting more problems than other subjects.

The amount of time devoted to the second practice test was explored for evidence of acquisitive behavior. Results of the planned contrast, comparing Reward/Uncertain subjects with both Reward/Certain and Cost/Certain conditions on the measure of time devoted to task, was significant, $T(1, 76) = 1.75, \ p < .05$. Reward/Uncertain subjects spent more time on task than other subjects. The analysis of variance indicated a significant main effect of Feedback, $F(1, 72) = 13.20, \ p < .001$. Subjects in the Cost conditions ($M = 469.19$ sec.) worked for shorter periods of time than did subjects in the Reward conditions ($M = 644.64$ sec.). As predicted, the Certainty main effect did not yield a significant result. The Feedback by Certainty interaction, although not significant, $F(1, 72) = 1.88, p = .18$, did suggest the predicted pattern of results (see Table 4).

**Claimed Acquisitiveness:** Analyses supported the prediction that Reward/Uncertain subjects would acknowledge their acquisitive behavior. The planned contrast yielded significant results, $T(1, 76) = 2.37, \ p < .02$. The analysis of variance on this measure of claimed behavior yielded a significant main effect of sex; $F(1, 72) = 4.656, \ p < .05$. Females ($M = 20.14$) claimed to have attempted fewer problems than did males ($M = 23.98$). Additionally, there was a significant main effect of Feedback, $F(1, 72) = 14.78, \ p < .001$, indicating that subjects in the Cost conditions ($M = 18.64$) claimed to have practiced less than did subjects in the Reward conditions ($M = 25.48$). The main effect of Certainty was not significant. Finally, the main effects were qualified by the expected interaction of Feedback and Certainty, $F(1,
4.01, $p < .05$. Thus, when subjects reported their own degree of practice, by estimating the number of problems that they attempted, results supported both the strong prediction that Cost/Uncertain subjects would self-handicap, and the supplementary prediction that Reward/Uncertain subjects would act acquisitively (see Table 5).

**Derived Measures:**

**Derived measures of self-handicapping:** The first "derived" measure of self-handicapping was designed to examine the correspondence between the amount that subjects actually practiced and the amount they claimed to have practiced. Specifically, the number of practice problems claimed by subjects was subtracted from the number attempted. Planned contrasts revealed that subjects in the Cost/Uncertain condition had a significantly lower difference score on this measure than did subjects in the Reward/Certain, Reward/Uncertain, and Cost/Certain conditions, $T(1,76) = 2.66, p < .01$. Table 6 (Appendix A) presents the means for this measure. In general, subjects claimed to have attempted many fewer (approximately 7 to 8) items than they actually attempted. The sole exception was among Cost/Uncertain subjects who attempted many fewer items (see Table 4) and said so (see Table 5).

An item was included on the final questionnaire to assess individual differences in subjects' beliefs about what constitutes a normative amount of practice. Specifically, the item asked subjects to estimate the number of practice problems that they believed "most people" attempt. Responses to this item were used as a baseline measure against which to compare subjects' self-handicapping behavior. Two measures of self-handicapping were derived. Compared against this value were 1) the
number of items subjects actually attempted, and 2) the number subjects claimed to have attempted. On both of these measures, lower scores indicate a reduction in practice relative to the comparison mean (with negative scores indicating that the subject attempted or claimed to attempt fewer problems than most other subjects). On the first of these measures, the planned contrast yielded significant results, $T(1,76) = 2.56, p < .02$, indicating that Cost/Uncertain subjects practiced less (relative to their estimates of other peoples' practice) than did subjects in the other three conditions. Table 6 (Appendix A) displays the means for this measure.

On the final derived measure, comparing the number subjects claimed to have attempted with the number they estimate others to attempt, planned contrasts failed to yield significant results. Table 7 (Appendix A) displays the means for this measure.

**Derived measures of acquisitiveness:** On the measures comparing the number of problems subjects actually attempted with the number they claimed to have attempted and with the number they claimed most people attempt, no significant results were obtained from the planned contrasts or analyses of variance. On the measure comparing the number they claimed to have attempted with the number that they felt that "most people" attempt, the Sex X Feedback X Certainty interaction yielded results that approached significance, $F(1, 72) = 3.34, p = .072$. Post hoc comparisons yielded no significant differences Table 7 (Appendix A) presents the means for this measure.

**SUBSIDIARY DEPENDENT MEASURES: THE FINAL QUESTIONNAIRE**

In addition to the two items designed to assess self-report of practice, the final questionnaire included several items designed to explore subjects' psychological
reactions to the experimental situation. Because these items followed the subjects' opportunities to self-handicap, it is possible that subjects' ratings on these items were affected by their self-handicapping (or acquisitive) behavior, and thus must be viewed with caution. Included on this questionnaire were items exploring subjects' degree of desired diagnostic information, attributions for performance, self-reported amount of effort, and amount of anxiety experienced during the study.

**Desired Level of Diagnosticity:** Desired level of diagnosticity was assessed through subjects' responses to three items on the final questionnaire. On 9-point scales, subjects were asked to indicate the manner in which they would like to have their final test results presented. On the first of three questions, the item was anchored at one end with the preference for the presentation of results to take the form of a single, global score and at the other end with the preference for specific and detailed subtest scores and descriptions. The second measure offered subjects the opportunity to attain social comparison information by seeing their results in comparison with other students at the same university. The third item asked subjects to indicate to what extent they preferred another detailed analysis of their areas of strengths and weaknesses. No significant results were obtained on any of these three measures of diagnosticity. Nevertheless, on all three measures, Cost/Uncertain subjects attained the lowest mean scores, indicating the weakest preference for diagnostic information (see Table 8, Appendix A).

**Attributions:** Four measures were included to explore subjects' attributions for their upcoming performance (see Table 9). On 9-point scales, subjects were asked to indicate the extent to which (1) ability, (2) effort, (3) luck, and (4) task difficulty
would affect their upcoming performance on the V-RAT. 2 (Sex) x 2 (Feedback) x 2 (Certainty) ANOVAS were performed on each of the measures. The measure of ability yielded a significant main effect of Feedback, $F (1, 71) = 9.87, p < .005$. Reward subjects ($M = 6.78$) indicated that ability would have more impact on their upcoming performance than did Cost subjects ($M = 5.87$). A significant main effect of Feedback was also obtained for the "effort" measure, $F (1, 71) = 4.33, p < .05$, suggesting that Reward subjects ($M = 7.30$) believed that effort would have a stronger effect on their final performance than did Cost subjects ($M = 6.74$). Thus on both the ability measure and the effort measure, the attributions of Reward condition subjects were more internal than the attributions of Cost condition subjects. There is some suggestion that this effect is most pronounced for Reward/Uncertain subjects. Post hoc comparisons (Tukeys) on the measure of ability showed that Reward/Uncertain subjects ($M = 7.15$) made stronger ability attributions than did Cost/Certain ($M = 5.85$) or Cost/Uncertain ($M = 5.85$) subjects. However, the interaction did not approach significance.

Analyses of the task difficulty item approached significance. There was a marginally significant Feedback main effect, $F (1, 72) = 3.68, p = .059$, such that Reward condition subjects ($M = 6.73$) attributed performance results more to task difficulty than did Cost condition subjects ($M = 6.20$). Analyses of the item addressing subjects' attributions to luck did not yield significant results.
DISCUSSION

For more than a decade it has been conventional wisdom that uncertainty is both necessary and sufficient to evoke self-handicapping (e.g. Berglas & Jones, 1978). It has been demonstrated that individuals who have been made to feel "uncertain" about their ability will often claim or acquire a handicap to performance. By engaging in this strategy, individuals create a situation that has clear attributional advantages. Specifically, if the person performs poorly on the task, the failure may be attributed to the interfering quality of the handicap, and lack of ability may be discounted as a causal attribute. Further, if the person performs well on the task, causal attributions to ability should be augmented because the person achieved the success in spite of a handicap. Although attributionally advantageous, self-handicapping involves a risk: the handicap may, indeed, interfere with performance and the individual may fail at the task.

In exploring the motivations for self-handicapping, research has focused on the discounting value of the strategy (e.g. Arkin & Baumgardner, 1985). That is, individuals become willing to risk failure (by self-handicapping) when they feel threatened by uncertainty and when they can obscure the ordinary relationship between ability and performance by embracing a handicap. Uncertain individuals
apparently prefer to maintain (or create) attributional ambiguity rather than risk the consequences of discovering the limitations of their ability. In short, it has been suggested that self-handicapping is an ambiguity-seeking behavior motivated by the discomfort created by feeling uncertain of one’s competence.

In contrast to self-handicapping theory, however, many theorists (e.g. Festinger, 1954; Trope & Brickman, 1975) have posited that individuals will respond to the inherent discomfort of uncertainty by seeking information and attempting to gain certainty and clarity about their abilities. It has been suggested that individuals seek accurate and stable appraisals of their abilities and of the world so that the world becomes predictable and controllable to them (e.g. Kelley, 1972). Uncertainty, then, has been posed as critical in eliciting information-seeking behaviors (e.g. Festinger, 1954). Thus a dilemma has arisen: uncertainty has been implicated as the motivational force behind two opposing behaviors, information seeking and information avoidance.

It is evident that uncertainty alone could not motivate two competing reactions. Thus, there must be a second component that, in combination with uncertainty, leads individuals either to self-handicap and embrace ambiguity or, conversely, to act acquisitively and seek diagnostic information about their abilities. It was proposed in the current study that an individual’s frame of reference, either pessimistic and worried or optimistic and challenging, is that second variable. That is, a worried, or "cost-oriented" uncertainty was suggested to be the precipitant to self-handicapping; an enthusiastic, or "reward-oriented" uncertainty was predicted to motivate acquisitive behavior.
Inspection of the independent variable inductions utilized in previous self-handicapping research suggests that the phenomenology of "uncertainty" created in these prior studies may have been confounded with a cost-orientation (e.g. Canavan-Gumpert, 1977) or risk averse (Kahneman and Tversky, 1984) frame of reference. For example, in the original Berglas and Jones (1978) paradigm, subjects attempted impossible test items and were then given "noncontingent" positive performance feedback. The experience of noncontingency may have focused subjects' attention on the possibility of failure well before they received feedback about their performance, and may consequently have made them feel uncertain and worried about any further testing.

The present study was designed to unconfound the experiences of uncertainty and cost-orientation, and to explore the extent to which these two states are necessary precipitating conditions and must co-exist for self-handicapping to occur. It was posited that self-handicapping is pursued when individuals feel a need to protect either self-esteem or social-esteem, and that this protectiveness is elicited when a person is made to feel both cost-oriented and uncertain about ability. By contrast, it was tentatively predicted that the combination of uncertainty and reward orientation would be experienced as an exciting challenge and would lead to acquisitiveness toward goals. Specifically, then, subjects who were both uncertain and cost-oriented were expected to self-handicap in the face of a performance evaluation. Subjects who were either made to feel certain, whether cost-oriented or reward-oriented, were expected to approach the task with moderate levels of energy.
Finally, subjects who were uncertain and reward-oriented were tentatively predicted to act acquisitively and pursue success with considerable effort and energy.

**SUMMARY OF MAJOR FINDING:**

_Self-Handicapping:_ The present study offered consistent evidence for the prediction that self-handicapping results from a combination of uncertainty and cost-orientation rather than from uncertainty alone. Results of the two main measures of acquired self-handicapping strongly supported the primary experimental hypothesis. Specifically, when given the opportunity to facilitate performance outcomes through practice prior to a test of competence, it was the subjects who were both cost-oriented and uncertain who demonstrated self-handicapping: These subjects both attempted the fewest practice problems and devoted the least amount of time to practice, in comparison with their counterparts in the other conditions. That is, when faced with a performance evaluation, subjects who were cost-oriented and uncertain acted in a self-protective fashion, maintaining attributional ambiguity by acquiring an impediment to success.

It was also predicted that subjects would claim a handicap if made to feel cost-oriented and uncertain. On the most direct measure of claimed self-handicapping, results supported the prediction that cost-oriented and uncertain subjects would claim to have practiced less than subjects in other conditions. Subjects in this condition, compared with subjects in the other experimental groups, claimed to have attempted the fewest practice problems in preparation for the final test. Thus, in addition to acquiring a handicap, cost-oriented and uncertain subjects also claimed to have handicapped their performance as well.
**Acquisitiveness:** Subjects who were exposed to reward-orienting stimuli were predicted to react to uncertainty by focusing on the possibility of positive outcomes. They were expected to be unconcerned with the possibility of failure. Accordingly, a secondary prediction of this study was that subjects who were made to feel uncertain of their abilities, but reward oriented, would act acquisitively, exerting more effort toward attaining success than individuals in other experimental conditions.

Results offered support, although somewhat more tentative, for the acquisitiveness of reward-oriented and uncertain subjects. These subjects attempted the greatest number of practice problems, although this trend was not statistically significant. However, the reward-oriented and uncertain subjects did spend significantly more time on task than other groups of subjects. Thus, this group of subjects apparently did exert effort to enhance their performance on the final test. They behaved in a manner consistent with the predictions of social comparison theory (Festinger, 1954) and attribution theory (Kelley, 1967, 1971) by attempting to resolve the uncertainty regarding their ability by testing their competence without the ambiguity that would be created by a handicap. Additionally, subjects in the reward-oriented and uncertain condition offered an estimate of the number of practice problems that they attempted that exceeded the claims of subjects in other groups. Thus, these subjects both acted acquisitively and acknowledged that they acted acquisitively.

**Summary and discussion:** Strong support was found for the primary hypothesis that cost-oriented and uncertain subjects would handicap their
performance. That is, in comparison to subjects in other conditions, these subjects practiced less and claimed less practice in anticipation of a performance evaluation. In contrast, subjects who were uncertain about their ability but who were reward-oriented acted acquisitively, manifest by their working harder and claiming more practice than subjects in other groups. Further, subjects who were led to feel certain of their abilities, regardless of cost or reward orientation, neither engaged in self-handicapping nor in acquisitive behaviors or claims.

Taken together, these findings help to explain the motivation for self-handicapping. The results support the contention that it is not merely a state of uncertainty that predicts self-handicapping, but a worried, or cost-oriented uncertainty. Individuals who are uncertain of their abilities, and who are worried that they may not be as competent as they would like, self-handicap so that the limitations of their abilities remain obscure. Apparently, self-handicappers prefer to maintain ambiguity about their abilities rather than risk that the information gained through an accurate performance evaluation would expose or confirm their dreaded lack of ability. Additionally, the results supported the notion that uncertainty coupled with an optimistic, or reward-oriented frame of reference, can be experienced as a challenge and lead to the development of an acquisitive approach to performance tasks. That is, subjects who are uncertain and reward-oriented appear to feel challenged by tasks and become motivated to reduce uncertainty by pursuing an accurate appraisal of their abilities.

Thus, the current research helps to bridge the gap between theories that predict different responses to the experience of uncertainty. Results of the present study
suggest that uncertainty is, indeed, experienced differently depending on the frame of reference of an individual. Further, it is this difference in the experience of uncertainty that appears to motivate individuals either to act in a protective fashion, as would be predicted by self-handicapping theory (e.g. Jones & Berglas, 1978; Arkin & Baumgardner, 1985) or to act acquisitively, as would be predicted by social comparison and attribution theory (e.g. Festinger, 1954; Kelley, 1972; Trope & Brickman, 1975). In general, then, a reduction of effort, in response to uncertainty, can be interpreted as a self-handicapping behavior that results in an avoidance of diagnostic information. An increase in effort, in response to uncertainty, may be understood as an acquisitive action that leads to the acquisition of diagnostic information.

However, while it is true that increased effort is likely to improve performance, it is not as clear that the performance results are always an accurate reflection of ability. According to Nicholls (1984), for example, "valid inferences of ability are presumed to require evidence that effort is equal and optimum across individuals" (p. 329). Thus, if acquisitive subjects are seeking to diagnose their level of ability, they must exert a degree of effort toward practice that is comparable to that of other subjects. Otherwise, attributions to ability may be viewed as suspect. Ambiguous performance feedback is a goal of self-handicappers, who expect lack of effort to be discounted (in the event of failure) because of the plausible attributions to lack of practice. However, for individuals who exert an inordinately high degree of effort, attributions to high ability may be discounted due to the plausibility that the heroic effort compensated for a deficiency in ability. Overly zealous practicers, then,
would increase their chance of success on a performance evaluation, yet the evaluation may lose some of its value.

An excessive degree of effort was not evident in the current study. Although there was no formal assessment to ensure that subjects' effort was not excessive, this conclusion can be inferred from an examination of their behavior during the study. For example, the mean number of practice problems attempted by the reward-oriented and uncertain subjects was 34.80 problems. While this mean does exceed the overall mean of 28.00 items attempted, the resulting difference of 6.80 problems attempted would not appear to represent an over-zealous effort on the part of these subjects. Evidence supporting the assumption that these subjects did not exert excessive effort is anecdotal and, therefore, empirically weak. Future researchers may wish to address this issue of effort expenditure more directly and systematically.

The motivations for individuals to exert extensive effort, and the implications of the performance results (both for self and for audience-others), constitute a fascinating domain for future research. A number of plausible explanations for this type of behavior exist. For example, excessive effort may reflect compulsivity. Alternatively, it may reflect an individual's desire to postpone evaluation. More relevant to the current domain of study, however, is the possibility that within the context of degree of effort, a comparison can be drawn between underachievers and overachievers.
Put simply, it is proposed that both underachievers and overachievers do not gain diagnostic information from their performance evaluations, but for differing reasons. Chronic underachievement has already been suggested as one example of self-handicapping (Jones & Berglas, 1978). Chronic underachievers were described as being uncertain but fearing that they would be discovered (by themselves or by others) as lacking ability, and fearing that their failures would be interpreted as confirming that lack of competence. By self-handicapping, these individuals attempt to maintain an illusion of competence by avoiding any confirmatory information regarding their level of ability. Thus, chronic underachievers seem to fear diagnostic information.

Chronic overachievers, on the other hand, may not exhibit this anxiety toward the evaluation of their competence. Rather, it is possible that overachievers fear failure. That is, perhaps these individuals exert such tremendous effort in an attempt to stave off any failure experiences, regardless of attributional or informational consequences. It is possible, then, that overachievers inadvertently obscure the diagnostic quality of performance evaluations by applying excessive effort to avoid failure. Thus, for underachievers, avoidance of diagnosticity is the goal, and possible failure is a calculated risk. For overachievers, avoidance of failure is the goal, and possible lack of information is a calculated risk.

At this point, it is only possible to speculate about the nature of excessive effort. Future researchers may wish to address this issue more fully. It would be possible to examine these ideas using a number of experimental methods. For example, by selecting subjects based on individual differences (under and over
achievement, compulsivity, etc.), or by attempting to manipulate fear of failure and fear of diagnosticity, researchers could examine the phenomenology of individuals who engage in this type of effort expenditure, as well as the situational variables that tend to motivate this degree of effort.

**SUBSIDIARY FINDINGS:**

The Complexities of Claims: In the present research, the interpretation of claimed self-handicapping is complex and warrants further exploration. The design of the study offered subjects the chance to claim their handicap only after they decided whether to engage the behavioral strategy itself. Thus, results of subjects' self-reports must be viewed with some caution, as the claims undoubtedly were influenced by prior behavior. Past research has offered subjects either the opportunity to acquire a handicap or the chance to claim an impediment but rarely both. Thus, the studies that explored claimed self-handicapping, by nature of their design, had the luxury of operationalizing the self-handicapping strategy simply as an increase in claims of some impediment relative to the claims of other experimental groups. In these prior studies, there was no self-handicapping action to interfere with the interpretation of the measures of claimed self-handicapping.

In the present study, subjects who were both cost-oriented and uncertain did claim to have practiced less than subjects in the other conditions. However, subjects reported their degree of effort (i.e. lack of effort) only after completing their practice sessions for the final test. Interpretation of this self-reported effort, then, may support either of two positions. It is possible that subjects' responses to the questionnaire items relevant to degree of practice were strategic ploys designed to
claim their withdrawal of effort. It is also possible, however, that subjects' responses to these measures were not strategic at all, but rather candid expressions of genuine perceptions. For example, the low estimate of practice stated by subjects who were both cost oriented and uncertain may have been claimed self-handicapping. Alternatively, because subjects who were cost-oriented and uncertain actually did attempt the fewest practice problems, their claim may not have been strategic or self-presentational at all, but instead, merely an accurate self-report of their actions. Thus, while it is clear that groups differed in the amount of practice reported, the basis of these differences is unclear.

If individuals engage in claimed self-handicapping, for self-presentational reasons, then claims would be expected when behavioral self-handicapping is not feasible, not effective as a claim, or not public. In favor of the strategic self-handicapping position, recall that there is long-standing support for a self-presentational interpretation of self-handicapping (e.g. Arkin & Baumgardner, 1985; Kolditz & Arkin, 1982). It has been suggested that one purpose of self-handicapping is to create and maintain a favorable (or at least not unfavorable) public image. Thus, the presence and attention of the audience would be crucial to strategic self-handicappers. In the present study, subjects' opportunity to handicap their performance (i.e. the second practice test) was private. Subjects worked on the second practice test in a private room and were not informed that the computer maintained a tally of the number of items attempted or of the amount of time devoted to the task. Thus, the chance to state their amount of practice explicitly on the questionnaire afforded subjects the opportunity to claim their handicap publicly for
the benefit of the experimenter and in the service of self-presentation. In accordance with self-handicapping expectations, cost-oriented and uncertain subjects did offer the lowest estimates of their own practice.

Additional support for the strategic self-handicapping interpretation comes from inspection of the derived measure in which subjects' claimed number of attempted problems was compared with their actual number of attempts. All experimental groups, with the exception of the cost-oriented and uncertain condition, consistently under-reported their amount of practice. Subjects who were both cost-oriented and uncertain estimated their amount of practice quite accurately. Subjects in the other conditions, however, underestimated their degree of practice, possibly affording themselves an attributional advantage. That is, these subjects benefited from more practice than they acknowledged and, therefore, should perform better than would be expected given their stated degree of practice. Thus, observers, believing the low estimate of practice, would be led to discount the influence of effort and augment attributions to ability. Cost-oriented and uncertain subjects appear to be the only subjects who did not take advantage of this self-serving maneuver. Perhaps they did not need this attributional advantage because they had already protected themselves sufficiently from the implications of failure.

Further, with the exception of the cost-oriented and uncertain condition, the mean number of problems attempted by subjects in all other conditions exceeded the number that subjects estimated other subjects to have attempted. Specifically, when asked to estimate the amount that other subjects practiced, most subjects estimated a number that was smaller than their own practice. These results mimic the finding of
the derived measure comparing the number attempted with the number that subjects claimed to have attempted (above). That is, subjects who were both cost-oriented and uncertain were the only group of subjects that did not offer themselves the attributional advantage of under-reporting the amount of effort that other subjects exerted. Subjects in the cost-oriented and uncertain conditions, then, were either unconcerned with the evaluations of others, unskilled at strategic self-presentation, or satisfied that they had already protected themselves from the consequences of negative attributions through their reduction of effort.

Subjects had already reduced their degree of practice to the point that an accurate claim would represent a reported decrease in practice below that expected from an individual striving for success. That is, subjects in the this condition practiced little enough that an accurate report of their effort would fall below expectations and thus serve as a claimed handicap. An everyday life analogy may help clarify this point: It is not unusual for students who have withheld effort in studying for a final exam (e.g., by procrastinating) to announce to their friends the amount of effort (i.e., lack of effort) that they exerted. The expectation is that their friends will recognize the inadequacy of the practice and make the desired attributions (as a result of discounting) and conclusions. That is, subjects who behaviorally self-handicap by reducing their study effort can claim a handicap merely by reporting their actions accurately. Because they have handicapped their performance, there is no reason to exaggerate further their claims.

An alternative to the strategic self-handicapping interpretation is that subjects who had already self-handicapped should feel protected from the implications of
failure and would, therefore, feel no need to engage in further self-handicapping. In short, subjects may not have been acting strategically. Instead, they may have been responding to questionnaire items with candor and without any motivational bias. In support of this notion, cost-oriented and uncertain subjects, relative to subjects in other groups, offered the most accurate estimates of their degree of practice. If these subjects were motivated by a self-presentational need to self-handicap, then they would be expected to report less effort than they actually exerted. Clearly, this was not the case in the present study. Thus, it seems from this measure that cost-oriented and uncertain subjects were not claiming a handicap but rather were reporting their actual degree of effort. Interestingly, the inaccuracies were consistent across all other conditions. This suggests that individuals are motivated to underestimate their effort, perhaps to encourage observers to attribute outcomes more to ability than to effort.

On the final derived measure, comparing number of practice problems claimed with estimates of other subjects' practice, results supported the argument that cost oriented and uncertain subjects were not inclined to claim a self-handicap. It appears that subjects in all conditions offered estimates of other subjects' practice that were comparable to the estimates they made of their own practice. Interpretation of this derived measure is consistent with the non-strategic interpretation of results. That is, if subjects were attempting to claim a self-handicap, it is likely that they would claim their own effort to be inferior to the effort of others. Instead, they stated that they exerted effort toward practice that was equivalent to the amount of effort exerted by other subjects.
Thus, there is some evidence that subjects did not engage in claimed self-handicapping. Some recent research on the effects of preexisting handicaps helps to explain why this would occur. Shepperd and Arkin (1989) suggest that when subjects' needs to protect themselves via self-handicapping have been satisfied by the establishment of an impediment, individuals are disinclined to acquire additional handicaps to performance. That is, when a subject has already self-handicapped, there is no need to do so again. Within the framework of the Shepperd and Arkin study, subjects in the current experiment would be viewed as having a preexisting handicap and thus would be expected to lack the motivation to seek further impediments.

It should be noted that the Shepperd and Arkin study addressed a situation in which subjects were able to attain a second discrete handicap. The present research merely afforded subjects the opportunity to capitalize on the preexisting impediment. In the present study, subjects acquired an impediment to future performance, and subsequently publicized that handicap ostensibly for self-presentational reasons.

In general, then, the current study yielded strong support for the prediction that behavioral and claimed self-handicapping would be evoked if subjects were made to feel both uncertain about their abilities and cost-oriented. However, the issue of interpreting claims of handicaps that occur subsequent to the acquisition of a handicap remains unresolved. Further examination of co-existing claimed and acquired self-handicapping would be a valuable addition to the literature.

**Desired Diagnosticity and Causal Attributions of Self-Handicappers:** Theoretically, it seems likely that subjects who are motivated to self-handicap would
be motivated to make external causal attributions and to avoid any diagnostic information that could threaten their precarious sense of competence. Likewise, it would be expected that acquisitive individuals would be motivated to attain additional diagnostic information and to make attributions that would confirm their high ability. Recall that the final questionnaire included items that were designed to assess subjects' desired level of diagnostic information for the final test. Specifically, the diagnosticity items asked subjects to state whether they preferred to receive global vs. specific feedback, the degree to which they would like to obtain social comparison information, and the amount of detail that they would like their performance feedback to reflect. Additionally, the questionnaire included items that were designed to assess subjects' causal attributions to ability, effort, task difficulty, and luck.

Analyses of items relevant to diagnosticity offered disappointing results. For example, subjects who were both cost-oriented and uncertain were expected to endorse items in a way that demonstrated a withdrawal of interest in amount of diagnostic information attained. Reward-oriented and uncertain subjects were expected to seek added diagnosticity. Results did not support the predictions. However, there are two possible explanations for these results. First, desire for diagnosticity was assessed through subjects' endorsement of three items on the final questionnaire. Because there was no indication that subjects would receive the amount of diagnosticity desired, subjects may have felt free to endorse the items without fear that their requests would be granted. Interestingly, subjects in all conditions endorsed the items in a direction consistent with desire for diagnostic
information. It is possible that this consistency in desire may reflect a social norm. That is, perhaps diagnostic information is not only desired for its uncertainty-reducing value, but also because a social norm dictates that people should desire diagnostic information.

As an alternative explanation for these results, it is possible that subjects' desire for, or avoidance of, diagnostic information was clouded by subjects' behavior on the second practice test. Specifically, subjects were allowed to self-handicap prior to responding to the items that inquired about diagnosticity. For subjects who had already self-handicapped, then, even discouraging diagnostic information would not offer much of a threat to self-esteem or social-esteem because it could be discounted by subjects due to their "lack of effort" on the practice test.

Results from questionnaire items relevant to subjects' attributions to ability, effort, luck, and task difficulty were generally disappointing. Reward-oriented subjects made more internal attributions for performance than did cost-oriented subjects. However, the expected tendency of cost-oriented and uncertain subjects to make external attributions was not found. Similar to the problems with the diagnosticity items, it is plausible that these attribution measures failed to yield support for the hypotheses because the opportunities to make causal attributions were made after subjects had already engaged in self-handicapping behavior. Thus, by the time subjects were presented with these opportunities, they had already acted in a manner that would reduce their worries about the implications of failure.
There are numerous unanswered questions regarding subjects' desire for diagnostic information and their preferred attributional strategies. In the present research, these issues were clouded by the intervening opportunities to self-handicap. Further research is needed to explore the differences in desire for diagnosticity and in attributional styles that would be expected between cost-oriented and uncertain subjects and their counterparts. For example, it would be interesting to explore the same antecedent conditions (i.e. uncertainty and cost-orientation) that led to self-handicapping in the current study, but rather than using a standard self-handicapping paradigm, allow subjects to choose the amount of diagnostic information to receive as feedback. Alternatively, subjects could be offered tests that differed in amount of diagnostic value, much like the studies of Trope and Brickman (1984); based on the present findings, it would be predicted that subjects who were both cost-oriented and uncertain would be motivated to avoid diagnostic information and reward-oriented and uncertain subjects would be expected to seek the information. Similarly, attributions could be measured in lieu of self-handicapping options. This approach would provide an opportunity to explore the cognitive processes more directly. That is, attributions would be measured without any interference from self-handicapping behaviors or their consequences.

**Gender Differences in Self-Handicapping:** The present study was designed so that self-handicapping of both males and females could be explored. The description of the hypothetical competence, called "Integrative Orientation," was carefully worded to highlight both aspects of intellectual achievement tasks and the verbal and socially relevant aspects of the task. The intellectual achievement aspect was
expected to encourage concern and interest of male subjects, while the verbal and social aspects of the task were expected to stimulate interest in female subjects. It appears that this effort to create a task that was viewed as compelling and important to both males and females was successful. That is, both men and women responded similarly to the opportunities to self-handicap, and they responded comparably to measures of reward- or cost-orientation and to measures of certainty and uncertainty.

Measures of acquired behavioral self-handicaps as well as measures of self-reported, or claimed, self-handicaps were included in the study in part to examine sex differences in preference for style of handicap. In past research, females claimed handicaps more than males, while males have been found to acquire handicaps more than females. Results, however, did not distinguish between genders in the present study.

As mentioned above, it is likely that the parity found in the current study reflects success of the cover story in engaging both male and female subjects. Gender differences found in previous research may reflect an experimental artifact, to some extent. That is, the tasks used in the studies (e.g. Berglas & Jones, 1978; Shepperd & Arkin, 1989), the domains in which self-handicapping was studied (e.g. depression), and the types of measures used (e.g. self-report of psychological symptoms) may have produced the differences. For example, many of self-handicapping researchers, in their quest to design tasks that sound "important" to subjects, have focused the task descriptions on self-handicapping in anticipation of an IQ type test. This type of intellectual ability component may be more compelling and threatening to males than to females. Some evidence for this comes
from the study of alcohol consumption by Bordini, Tucker, Vuchinich, and Rudd (1986) who used a social judgment test (rather than an intellectual ability task) to study self-handicapping among women, and found evidence that women would handicap their performances by ingesting alcohol.

In sum, examination of the current findings suggests that it is possible to elicit self-handicapping from both male and female subjects within the same study. When situations are framed in a manner that is compelling and important to both male and female subjects, for instance by incorporating components of intellectual and social tasks simultaneously, gender differences disappear for both claimed and acquired self-handicapping. Thus, it is possible that gender differences found in prior research are an artifact of the experimental procedures. Alternatively, it is possible that the differences previously found are demonstrative of preferred styles of self-handicapping (e.g. women are more likely to claim emotional symptoms), rather than a desire to engage in self-handicapping if the conditions are correctly designed.

**Cost and Reward Orientations:** There is inherent difficulty in examining an acquisitive orientation in an experimental paradigm using competence (or intelligence-like) tasks. Test-taking situations tend to be threatening for many subjects. There is always the potential for subjects' performance to fall short of their wishes and to challenge subjects' sense of efficacy and competence. With the strong achievement motivation present in our society, and with the strong appeal of discovering or confirming one's own sense of innate competence, it is likely that in most experiments, no matter how reward-orienting, subjects' sense of risk and of cost-orientation may be stimulated. Further, this sense of risk is not specific to the
conditions created for experiments. Individuals are faced with inherently cost-orienting experiences and evaluations throughout their lives. Most examinations (including final exams in school, drivers' tests, and first dates) have cost-orienting components. Many people grow-up in families or attend schools in which there is more attention to error than to success. To create a reward orientation in subjects, therefore, it was necessary to overcome some of the properties inherent in the task, salient in our societal values, and reinforced in subjects' family experience.

In the present study, the induction of a reward-orientation may have been somewhat weak, but it was at least moderately successful. Prior to this study, situational cost-orientation had only been created experimentally in children (Canavan-Gumpert, 1977). It seems intuitively likely that people develop a characteristic approach to problems, including test-taking, and that these life-long approaches would be dominant over situational features of a simple hour long experiment. However, Kahneman and Tversky's (1984) work on loss aversion showed that adults may also be susceptible to the framing of a problem or situation. Results of the current research suggest not only that individuals can develop a cost or reward orientation consequent to the mild manipulations of a controlled experiment, but that the resulting orientation can become strong enough that subjects' behavior on a task will change as a result of this induced frame of reference. One contribution of this study, then, is that it demonstrates that cost and reward orientations can be induced experimentally in adults.
If cost and reward orientations can be created through simple experimental procedures, what then must be the effect on a child of being raised in a family or society that is consistently cost-orienting? Some parents continually point out their children's faults and shortcomings. Many teachers only acknowledge children's mistakes, and ignore their successes. Music teachers and coaches, for example, will sometimes count children's errors without focusing any attention on their talents or successes. Children raised with this constant focus on the negative aspects of their behavior may mature attending more to potential losses and costs in any risky situation. According to Berglas and Jones (1978), there are "individuals who rarely enjoy success at anything and who have been forced to scale down their expectations about the effects of their actions... they are 'klutzes,' and they know it." Yet there are other individuals who are cost-oriented and who feel uncertain about their abilities, those who have embraced and maintained some ambiguity, those who hold on to some meager hope that they are competent. These are the individuals who are candidates to become chronic self-handicappers. These are the individuals who face uncertainty with a dread that they will be discovered to be imposters, that their successes will be exposed as merely attributable to luck or chance, and that their incompetence will finally be confirmed.

For cost-oriented individuals, ambiguity and uncertainty may allow a sense of comfort. These individuals view the world as full of risks and possibilities for failure. They worry that they lack ability and fear that any test of competence will only confirm their inadequacies. After examining the cost-oriented frame of reference, the motivation to self-handicap becomes clear. That is, if one is worried
that diagnosis might confirm inadequacies, then it is safer to avoid this information and embrace the ambiguity. It is within the ambiguity afforded by self-handicapping that cost-oriented people can develop a fantasy of competence or excellence. Self-handicapping, then, is a protective response to the threat felt when uncertainty is coupled with a cost-orientation.

In addition to a pessimistic orientation to performance, it is possible that cost-oriented individuals are responding to different types of goals than reward-oriented individuals. Dweck and Leggett (1988) suggest that there are two types of goals, "learning goals," and "performance goals." With learning goals, an individual focuses on mastering a task or skill; performance (especially in comparison to others) is irrelevant. Conversely, performance goals suggest an approach in which the individual is solely "concerned with gaining favorable judgments of their competence" (p. 256). It seems that self-handicappers are more concerned with performance goals than with learning goals. They are so distracted by the pressures to succeed (i.e., not to fail), that the value of mastery is lost.

Finally, self-handicappers may adhere to the standards discussed by to Jones (1989) regarding the "personality ethic [that] has substituted competence for diligence as a major component of the desired self-image"(p. 480). According to Jones, (1989), "most of us would rather be a little gifted than a lot dogged" (p. 481). The threat of failure within the context of increased effort could be crushing to a cost-oriented individual. That is, for cost-oriented individuals, who are focused on the consequences of performance outcomes rather than the process of mastery, failure that occurs in spite of increased effort would be experienced as confirmation
of inadequacy. If the individual withholds effort, at least he or she could discount lack of ability as the causal attribute. Reward oriented individuals, on the other hand, may live more by the work ethic that was so identified with American culture in earlier times. In sum, cost-oriented individuals may differ from reward-oriented individuals both in their attitudes toward evaluation and in the goals that they choose when pursuing a task.

Concluding Remarks

In the present study, the conditions necessary to evoke self-handicapping were explored. Past research on self-handicapping has suggested that individuals are motivated to self-handicap when they feel uncertain about their competence. It was suggested in the current paper that uncertainty, the traditionally identified antecedent to self-handicapping, could not be the sole motivating factor. It was posited that uncertainty may be experienced differently depending on an individual's frame of reference. Indeed, it has been posited that uncertainty is the prime motivator in information seeking behaviors (e.g. Festinger, 1954, Trope & Brickman, 1975, Sachs, 1982). Yet, self-handicapping has been described as a behavior undertaken in an effort to avoid information, cloud causal attributions, and embrace ambiguity. How, then, could uncertainty, the generally accepted motivator for information seeking, also be the motivation for self-handicapping, an information avoidance behavior?

In the current study, it was hypothesized that subjects who were made to feel uncertain would experience the uncertainty in one of two ways: Subjects who were made to feel cost-oriented would experience the uncertainty with forboding, worry
about an upcoming test, focus on the possibility of making mistakes, and develop the self-protective stance necessary to evoke self-handicapping; subjects who were induced to feel reward-oriented were expected to experience the uncertainty with excitement, feel challenged by an upcoming test, focus on the possibility of attaining excellence, and develop an acquisitive posture.

Given several measures of self-handicapping, strong and consistent support was found for subjects to both claim and acquire a handicap when they were made to feel uncertain about their ability and when they were made to focus on the possibility of costs and losses rather than potential excellence. The cost-oriented and uncertain subjects attempted the fewest practice problems, claimed the least effort, and devoted the least amount of time to practicing, both when compared to other subjects and when compared to their self-report. Perhaps the most important contribution of this study is that it offers a conceptual framework with which to bridge the findings and assertions of the self-handicapping literature with the previous works of social comparison and attribution theorists. Specifically, uncertainty can now be posed as the motivator underlying both information seeking and self-handicapping without risking any contradiction in theory. That is, uncertainty in a cost-oriented context may be experienced as threatening and may motivate subjects to seek handicaps and embrace attributional ambiguity. Uncertainty in a reward-oriented context may be experienced as challenging and exciting and may lead subjects to exercise their acquisitiveness and strive for excellence.
REFERENCES


APPENDIX A
TABLES
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Higher mean scores indicate higher levels of certainty. Means not sharing common subscripts, within rows and columns, are significantly different (p<.05; Tukey tests throughout). Subscripts associated with marginal means pertain only to comparisons between the marginal means and are included only when significant and relevant.
### Table 2
Means for Reward and Cost Orientation Manipulation Checks

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Higher mean scores indicate stronger agreement with the item question. Means not sharing common subscripts, within rows and columns of each item, are significantly different (p<.05; Tukey tests throughout). Subscripts associated with marginal means pertain only to comparisons between the marginal means and are included only when significant and relevant.
Table 3
Mean Ratings for Satisfaction with Performance on First Practice Test

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<tr>
<td></td>
<td>5.97</td>
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Higher mean scores indicate greater degree of satisfaction. Means not sharing common subscripts, within rows and columns, are significantly different (p<.05; Tukey tests throughout). Subscripts associated with marginal means pertain only to comparisons between the marginal means and are included only when significant and relevant.
Table 4

Acquired Self-Handicapping

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Scores indicate mean number of practice problems attempted or number of seconds devoted to practice (on second practice test). By individual comparison T-tests, means not sharing common subscripts, within rows and columns, are significantly different (p<.05).
Table 5
Claimed Self-Handicapping

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Scores indicate mean number of practice problems that subjects reported to have attempted. By individual comparison T-tests, means not sharing common subscripts, within rows and columns, are significantly different (p<.05).
Table 6
Derived Measures of Acquired Self-Handicapping

<table>
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<th>Attempted minus Claimed</th>
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</table>

Scores indicate mean differences in number of practice problems that subjects actually attempted versus the number they claimed to have attempted (left panel) or the number they claimed most people attempt (right panel). By individual comparison T-tests, means not sharing common subscripts, within rows and columns, are significantly different (p<.05).
Table 7
Claimed Number Attempted minus Claimed Others Attempt

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<td>Cost</td>
<td>1.27</td>
<td>1.60</td>
</tr>
</tbody>
</table>

Scores indicate mean differences in number of practice problems that subjects claimed to have attempted versus the number they claimed most people attempt.
Table 8
Means for Measures of Desired Level of Diagnosticity

<table>
<thead>
<tr>
<th>Reward</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire for Global vs. Specific Feedback:</td>
<td></td>
</tr>
<tr>
<td>Certain</td>
<td>6.35</td>
</tr>
<tr>
<td>Uncertain</td>
<td>6.15</td>
</tr>
</tbody>
</table>

Desire for Social Comparison Information:

| Certain | 6.85 | 6.90 |
| Uncertain | 7.30 | 6.30 |

Desire for Detailed Analysis:

| Certain | 6.95 | 6.55 |
| Uncertain | 7.10 | 6.20 |

Higher mean scores indicate stronger desire for diagnostic information.
Table 9
Subjects Mean Ratings of Attributions to Ability, Effort, Task Difficulty, and Luck

<table>
<thead>
<tr>
<th></th>
<th>Reward</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certain</td>
<td>6.40&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>5.85&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td>Uncertain</td>
<td>7.15&lt;sub&gt;a&lt;/sub&gt;</td>
<td>5.85&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>6.78&lt;sub&gt;a&lt;/sub&gt;</td>
<td>5.85&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td>Effort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certain</td>
<td>7.40&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>6.75&lt;sub&gt;ab&lt;/sub&gt;</td>
</tr>
<tr>
<td>Uncertain</td>
<td>7.20&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>6.65&lt;sub&gt;ab&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>7.30&lt;sub&gt;a&lt;/sub&gt;</td>
<td>6.74&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td>Task Difficulty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certain</td>
<td>6.90&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>6.30&lt;sub&gt;ab&lt;/sub&gt;</td>
</tr>
<tr>
<td>Uncertain</td>
<td>6.55&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>6.10&lt;sub&gt;ab&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>*6.73&lt;sub&gt;a&lt;/sub&gt;</td>
<td>6.20&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td>Luck</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certain</td>
<td>5.35</td>
<td>4.75</td>
</tr>
<tr>
<td>Uncertain</td>
<td>4.95&lt;sup&gt;+&lt;/sup&gt;</td>
<td>5.60</td>
</tr>
<tr>
<td></td>
<td>5.22</td>
<td>5.20</td>
</tr>
</tbody>
</table>

Higher mean scores indicate stronger agreement with the item question. Means not sharing common subscripts, within rows and columns of each item, are significantly different (p<.05; Tukey tests throughout). Subscripts associated with marginal means pertain only to comparisons between the marginal means and are included only when significant and relevant. *Feedback main effect for Task difficulty only approached significance (p = .059).
APPENDIX B

EXPERIMENTAL PROTOCOL

(Including Verbatim Script)
The following is the experimental protocol, including both the instructions to the experimenter and the verbatim script. Procedural notes to the experimenter appear in bold face type. Verbatim script appears in quotations. Instructions that are presented by the computer appear in italics.

Meet subject in waiting room. While walking through hallway, thank subject for signing up for study and explain policy regarding subject's right to discontinue experiment at any time.

(In lab):

"My name is Karen Kovacs and I work with Professor Robert Arkin. I am a graduate student in psychology and will be running the experiment today. As you know, this is a study designed to develop local norms for the Verbal Reasoning Association Test, or V-RAT, a test of Integrative Orientation. Integrative Orientation is a capacity that is associated with creative problem solving and it is related to your ability to process and integrate verbal information independent of your overall intellectual capability. People who are high in Integrative Orientation are better able to generate new information from previously known information; they are able to abstract and generalize; and they are able to find new solutions to problems. The test, then, is able to predict many differences in peoples' functioning, especially their ability to adapt to
novel and changing situations, and to learn from and use information.

"As I just mentioned, Integrative Orientation is not accurately measured by standard intelligence tests. In fact, when norms have been developed at other universities, there is a fairly normal curve across students, and about half of the university students scored high in Integrative Orientation and about half were low, and performance was not correlated with academic performance. Do you have any questions?

"You will complete the V-RAT at the end of the hour. And since the test is on the computer, we will be able to score it and then report your score to you. Thus, when the session is over, you will be able to review how high or low your level of Integrative Orientation is. Throughout the session today, you will be asked to fill out some questionnaires so that we can assess how you are feeling and what you are thinking.

"The final test is a 10-minute, timed test. Before you take the test, we are going to offer you some practice. Obviously, when people attempt a new type of task, practicing can be advantageous in attaining the best possible score. Some people have not had very much experience working on this type of integration problem. So, we have created a set of practice problems that are similar to those that you will see on the V-RAT. You will complete two separate practice tests, each of which offers you practice at a different aspect of Integrative Orientation. The final test will involve a combination of the skills you will
practice on the two practice tests. The practice problems will be similar to the V-RAT in terms of difficulty level and type of problem. Just as athletes perform better after warming up, you should do better on this test if you practice and 'warm up' with the practice tests. Do you have any questions about today's experiment?”

Check clipboard for ss #, ask ss to enter #, age, gender. 100 level numbers Indicate Reward Orientation; 200 = Cost; 300 = No Feedback. Explain menu:

Menu reads:
Test Menu

<table>
<thead>
<tr>
<th>Code</th>
<th>Test Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Practice Test I</td>
</tr>
<tr>
<td>2.</td>
<td>Practice Test II</td>
</tr>
<tr>
<td>3.</td>
<td>Test Form - Individual</td>
</tr>
<tr>
<td>4.</td>
<td>Final Form - Group</td>
</tr>
<tr>
<td>5.</td>
<td>Score Analysis</td>
</tr>
<tr>
<td>0.</td>
<td>End Program</td>
</tr>
</tbody>
</table>

Please enter option. . . . .

"What you are looking at is the function menu. As you see, there are 2 practice tests. After you complete the practice sessions, there are 2 forms of the test, "individual" and "group." Obviously, you will be taking the individual form. Finally, there is a score analysis program so that we can look at, and interpret your results. Do you have any questions?"
Get up to leave and as you leave, say:

The first practice test will be administered by the computer. It will consist of 25 analogy problems. You can read the instructions on the computer screen and then answer each question by pressing the appropriate key to indicate your answer. For example, if your answer is "3" you press the "3" key. You should take about 8 to 10 minutes on this practice test. (for Reward and Cost only:) Also, periodically, the computer will give you feedback on your performance. By periodic, I mean that the computer is programmed to spot check your answers randomly and give you feedback. That is, out of 25 questions, you will probably get feedback about 4 - 5 times. Do you understand?"

Computer instructions for Practice Test 1:

Here is a description of the test items for you. Each item requires that you solve an analogy. Analogies are word relationships and as such should be tackled with the same kind of attitude you have for a crossword puzzle or a game of scrabble. Each item will provide you with two words that are related. Your job is to figure out the nature of that relationship and to determine which of the multiple choice answers best expresses that same relationship. Here is an example:

CEDAR: WOOD
1. pine: chest
2. mica: gold
3. copper: metal
4. circle: cube
5. lynx: animal

Cedar is a particular kind of wood. The answer is (3) because copper is a particular kind of metal and therefore the two parts make an analogy. Do you understand how to answer these items? YES NO
Reward-Salient Feedback = Periodically during the subject's performance, feedback messages will appear on the computer screen. Feedback (1), (3), (4), and (5) will read: "Right! Keep up the good work!" Feedback (2) will read: "Incorrect Answer."

Cost-Salient Feedback = Periodically during the subject's performance, feedback messages will appear on the computer screen. Feedback (1), (3), (4), and (5) will read: "Wrong! Please be more careful to avoid further errors." Feedback (2) will read: "Correct Answer."
Cost/reward instructions to follow first practice test:

"As I mentioned earlier, you will be filling out some questionnaires. Here is the first one. We are interested in how people come to explain and understand themselves and their performances. Therefore, before we continue, I would like you to take a minute and imagine that you have just completed the V-RAT. Of course, we do not yet know enough to predict how well you are going to do on the test, but we want you to imagine that you have just done very well / very poorly on the test. Again, we really do not yet know how good you are at this, we just want you to imagine that you have done very poorly/very well. Try to imagine this as vividly as you can. Make it as realistic as you can. Imagine that you have already completed the final 10-minute timed test and that you got a really high/low score. Imagine that I came in to the room and we checked on the score analysis and saw this really great/bad score and then we checked the subscores and you did really well/poorly on all of those, too. Can you imagine that? (pause for response) Can you make it seem vivid and real? Now, I would like you to use this page and write down at least 5 separate thoughts explaining why you might have done so well/poorly. Please write complete thoughts and complete sentences explaining your results. And, finally, I want you to make the explanations something personal about you. Think of things about yourself, the kind of person you are, your personal characteristics and your personal qualities. Think about who you are and what kind of a person you are. For
example, you could use the words, "I am." You could say, "I did so well/poorly because I am whatever" or "... I am a whatever kind of person." And fill in a trait or quality. (pause) Now use those personal characteristics as explanations for why you did so well/poorly. Remember to write down at least 5 personal characteristics that explain your performance on the test. And use complete sentences. You have five minutes to complete this. And I will come back in when your time is up. If you finish 5, just keep going, but make sure that you get at least 5. Remember to use your personal characteristics and traits to explain why you did so well/poorly on the test. Keep vividly imaging how well/poorly you did and it will help you think of personal qualities to explain this performance."
Present the Interpolated Task for No Feedback Conditions

"We need a short break before the second practice test. So, I'd like you to fill out this questionnaire for another study in our lab. It asks about student interests. Just fill it out and tell me when you're done. Then we'll go on to the next practice test."
Certainty/Uncertainty Instructions (following first practice test):

"We need to know which type of analysis to use on your final V-RAT.

"You know that everybody approaches problems differently, right? Well, we are able to look at your style of approaching integrative orientation problems. What we are going to do, before we go on to the second practice test, is to see what approach you have taken. Later, we can interpret your V-RAT based on your own personal style. We will use your first practice test results and calculate which of the many profiles you fit. Everybody fits one pattern or another. So, your raw score doesn't really matter; it's only used as part of the calculation. What is really meaningful is your personal style of approaching these problems - which we will see in your profile pattern. The closer your numbers fit to one of the profiles, the more interpretable your results are; then, the more confident we are of the interpretation of your scores. The closer your numbers fit, the more accurate your results are; it has nothing to do will how well or poorly you did, only with how accurate your results are.

"Let's let the computer start the calculations. And then we'll match up your numbers with one of the profile patterns and see how close, and interpretable it is. The "Surgency Profile" is calculated like this: The computer will calculate 5 factors. Some of the numbers are supposed to be high and some low - they just give us your pattern. Then the computer will star
one/two factor(s) to indicate your Surgency - or which type of approach you use when you have to compensate and adapt. The stars helps us find your Surgency profile in the manual. Then we can look and see how close it is and how accurate our interpretation can be.

For Uncertainty Condition: Press "control N"

"You should get 5 critical factors. Now, it should put one or two stars on one of the factors to indicate your surgency scale, or the approach you are most comfortable with.

(look at screen) That's strange. I've never seen that before! You have two surgency scales!! See the starred scales? Those are your surgency scales. They represent your compensation capacity - your adaptive approach. There's only supposed to be one. I've never seen anybody get two surgency scales before. I didn't even know that could happen. I'm not even sure how to look it up. One star on A usually represents Uni-Kronic Surgency. And two stars on C is usually Di-... Di-Tryptic. Well, it has to be one of them. It probably just added an extra scale somehow. Let's try to look it up. It will fit one of the two. Here's Uni-Kronic. (check manual and read off #s). Let's try Di-Tryptic. (check manual and read off #s). Hmmmmm. Maybe Di-Kronic. (check manual and read off #s). Which profile do you think it fits better? I really can't even tell you what this means or what your surgency scales are. Your performance does
not fit any pattern for analysis. I don't really understand it. Maybe it was a computer malfunction. I guess we can't give you any information about your performance on the first practice test. I can't tell you anything about your score or the accuracy of the results. Oh, well. We'll just run the analysis on the final test."

Present Interim Questionnaire:

Why don't you fill this out and then we'll move on to the second practice test.

For Certainty conditions: Press: control Y:

"17, good. Now you should get 5 critical factors. Now, it should put one or two stars on two of the factors to indicate your surgency scales. (look at screen) See, you have two surgency scales. That's what we expected. See the starred scales? Those are your surgency scales. They represent your compensation capacity - your adaptive approach. Let's look it up. One star on A usually represents Uni-Kronic Surgency. but when added to a double star surgency on Factor C, it should be a Tri-Tryptic pattern. The closer you are, the more accurate your results are. (check manual and read off #s). Hmmmmm. Just what we expected. That's really close. You see, everybody fits one or another. After you take the V-RAT, we will be able to analyze and interpret your results by using a Tri-Tryptic analysis. And since the pattern's so close, we'll get an accurate analysis."
Present Interim Questionnaire:

"Why don't you fill this out and then we'll move on to the second practice test."
For No Information condition: Press "control N":

Immediately present Interim Questionnaire

"Why don't you fill this out and then we'll move on to the second practice test."
Instructions for the Second Practice Test (main dependent measure):

"Let's go on to the second practice test. You will be allowed to practice as much or as little as you like. The more you practice on this test, the better your V-RAT score should be. On this test, you will be solving analogies again. But this time, the rules underlying the analogies will be different. And the analogies will be in a different form. Just like the last set of analogies, you will begin to learn the rules as you practice with this set of problems. Thus, although these problems are still analogies, the logic behind them, and the relationships that they test are different than the last practice test. Again, remember that practice, or "warming up" should help you to score better on the V-RAT. Just like athletes warm up before a big meet or game, we'd like you to spend as much or as little time as you would like warming up before you take the final test. If you are warmed up, you should score better on the test. In fact, we've found in the past that people can improve their scores by practicing on this second warm-up test. The computer will give you instructions for this practice test, and for how to stop when you feel ready for the final V-RAT. So, go ahead and solve as many or as few problems as you like."
Debriefing Form

Discuss the following: We are done with the experiment and you do not have to take the final test. Are you surprised? Obviously, we did not tell you everything about the study when you got here. We couldn't because we are trying to simulate the real world in the lab and we were trying to create a situation that felt real to you. It's like if we were studying peer pressure... etc.

Ask subject the following questions and record its answers below:
Do you have any comments or questions?

What made you decide to stop practicing?

What do you think we were studying?

What did you think of the 1st practice test?

What did you think of the 2nd practice test?

What did you think of the feedback on the 1st practice test?

How many positive feedback statements did you get? _____
Negative statements? _____

What did you think of your surgency profile? About how closely it matched? According to the profile, how accurate were your results? What did it say about how well you did on the test?

Debrief subjects thoroughly and completely (as trained). (use e.g.s incl: not studying for college exam; athlete who plays football day before competition/meet and is too sore to do well; businessman-alcoholic who can't be blamed for lost deal. All have ready excuse for failure and seem even better if they perform well in spite of handicap. Explain that S-H comes from situation - NOT a personality issue- and that we are trying to create the situation in the lab = combo of uncertainty and cost orientation.)
APPENDIX C
DEPENDENT MEASURES
Interim Questionnaire I

1. What score do you think you achieved on the first practice test?
   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

2. How pleased were you when you got a right answer?
   1 2 3 4 5 6 7 8 9 not at all entirely

3. How bothered were you when you got a wrong answer?
   1 2 3 4 5 6 7 8 9 not at all entirely

4. How gratifying would success be on the final V-RAT?
   1 2 3 4 5 6 7 8 9 not at all entirely

5. How distressing would failure be on the V-RAT?
   1 2 3 4 5 6 7 8 9 not at all entirely

6. How satisfied are you with your performance on the first practice test?
   1 2 3 4 5 6 7 8 9 not at all very satisfied

7. How high is your level of Integrative Orientation?
   1 2 3 4 5 6 7 8 9 very low very high

8. Based on your Critical Factors and Surgency scores, how confident are you that you will perform well/poorly on the final V-RAT?
   -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10 +11
   completely certain completely certain that I will do poorly uncertain completely certain that I will do well
Interim Questionnaire II

1. How many problems do you think you attempted on the second practice test? ______

2. How many problems do you think most people attempt on the second practice test? ______

3. How important is practice to your performance on the V-RAT?

   1 2 3 4 5 6 7 8 9
   not at all entirely

4. How would you like your V-RAT results reported to you?

   1 2 3 4 5 6 7 8 9
   one global specific subtest score scores

5. I would you like to see my performance results in comparison with other OSU students.

   1 2 3 4 5 6 7 8 9
   Strongly strongly disagree agree

6. I want a detailed analysis of my areas of strength and weakness in integrative orientation.

   1 2 3 4 5 6 7 8 9
   Strongly strongly disagree agree

7. To what extent do you believe that your ability will affect your performance on the V-RAT?

   1 2 3 4 5 6 7 8 9
   it is not it is very important important

8. To what extent do you believe effort will affect your performance on the final V-RAT?

   1 2 3 4 5 6 7 8 9
   it is not it is very important important
9. To what extent do you believe luck will affect your performance on the final V-RAT?

1 2 3 4 5 6 7 8 9
not at all entirely

10. To what extent do you believe that your V-RAT score will be due to the difficulty of the test?

1 2 3 4 5 6 7 8 9
not at all entirely

11. How anxious did you feel during this experiment?

1 2 3 4 5 6 7 8 9
not at all entirely
APPENDIX D
ANALOGY ITEMS
(Easy, Medium, and Hard)
E1. ELM: TREE

dollar: dime
currency: dime
map: leaves
oak: maple
dollar: money  (5)

E2. RAIN: STORM

wind: hurricane
hail: thunder
snow: freeze
clouds: sky
sun: warm  (1)

E3. GUN: HOLSTER

shoe: soldier
sword: warrior
paper: pen
books: school bag
cannon: plunder  (4)

E4. DOCTOR: DISEASE

miser: money
illness: prescription
sheriff: crime
theft: punishment
intern: hospital  (3)

E5. LARGE: ENORMOUS

lion: tiger
warmth: frost
plump: fat
royal: regal
happy: solemn  (3)

E6. READ: BOOK

taste: salty
movie: attend
sound: odor
listen: record
touch: paper  (4)
E7. CHAIR : FURNITURE

- tire : iron
- tree : plant
- food : meat
- boat : float
- transport : car (2)

E8. FORREST : DESERT

- wig : coat
- egg : hen
- rain : drought
- skin : scar
- young : healthy (3)

E9. CANOE : SHIP

- pistol : cannon
- canoe : paddle
- oar : water
- aft : stern
- land : sea (1)

E10. POWERFUL : LARGE

- muscle : boxer
- same : alike
- strength : exercise
- weak : small
- clipboard : stopwatch (4)

E11. BRIGHT : BRILLIANT

- color : red
- yellow : green
- window : light
- light : dark
- happy : ecstatic (5)

E12. SPANIEL : DOG

- kitten : cat
- lion : tiger
- spider : fly
- robin : bird
- fish : trout (4)
E13. MAXIMUM : MINIMUM

pessimist : optimist
minimum : optimum
best : good
most : least
wane : wax (4)

E14. PROTEIN : MEAT

calories : cream
ergy : sugar
cyclamates : diet
carbohydrates : potatoes
fat : cholesterol (4)

E15. GOBBLE : TURKEY

poison : cobra
bark : tree
trunk : elephant
twitter : bird
king : lion (4)

E16. MILK : BUTTER

eggs : omelets
fruit : tree
steer : sheep
water : ice
vine : grape (1)

E17. KEY : DOOR

combination : safe
keyhole : porthole
lock : key
opening : closing
bolt : safety (1)

E18. STUDYING : LEARNING

running : jumping
investigating : discovering
reading : writing
dancing : singing
feeling : thinking (2)
E19. ROLE: ACTOR

opera: soprano
private: soldier
melody: singer
position: ballplayer
character: part (4)

E20. RUN: WALK

slow: fast
hard: soft
big: small
sprint: jog
cold: hot (4)

E21. FURIOUS: ANGRY

cold: hot
love: like
look: listen
yell: hit
wish: fulfillment (2)

E22. WOOD: PAPER

chair: wall
cut: clip
oil: gasoline
fireplace: lighter
forest: fire (3)

E23. CHOP: MINCE

fry: bake
meat: cake
axe: mallet
Washington: Lincoln
stir: beat (5)

E24. DECEMBER: WINTER

April: showers
September: tornado
June: fall
March: spring
February: snowstorm (4)
E25. CONCERT : MUSIC

performance : art
exhibition : art
play : actor
operetta : singer,
flute : soloist (2)
ANALOGIES: MEDIUM ITEMS

M1. PEARL : WISDOM

fall : winter
knife : murder
sickle : grain
harvest : crops
arrow : love (5)

M2. CARNIVORE : ANIMALS

omnivore : omelets
vegetarian : vegetables
trace : minerals
herbivore : healthy
pollination : plants (2)

M3. MAUVE : COLOR

basil : spice
colorless : colored
light : dark
tan : brown
blue : rainbow (1)

M4. MUFFLE : SILENCE

cover : bell
sound : hearing
cry : loud
stymie : defeat
glimpse : look (4)

M5. BONES : LIGAMENT

break : stretch
muscles : tendon
fat : cell
knuckle : finger
knee : joint (2)

M6. WATERMARK : BIRTHMARK

buoy : stamp
paper : person
tide : character
line : signal
meaning : significance (2)
M7. NEWS REPORT : DESCRIPTIVE

weather report : unpredictable
editorial : objective
feature story : newsworthy
commercial : prescriptive
joke : funny (4)

M8. AGREEMENT : CONSENSUS

count : census
pleasure : enjoy
peace : tranquillity
argument : solution
action : incite (3)

M9. WATER : HYDRAULIC

energy : atomic
power : electric
gasoline : combustion
pressure : compress
air : pneumatic (5)

M10. PROW : SHIP

snout : hog
nose : airplane
bird : beak
wheel : car
point : shaft (2)

M11. SENSATION : ANESTHETIC

breath : lung
drug : reaction
satisfaction : disappointment
poison : antidote
observation : sight (4)

M12. DISEMBARK : SHIP

board : train
dismount : horse
intern : jail
discharge : navy
dismantle : clock (2)
M13. GOLD : PROSPECTOR

medicine : doctor
prayer : preacher
wood : carpenter
clue : detective
iron : machinist (4)

M14. PECCADILLO : CRIME

district attorney : criminal
hesitate : procrastinate
armadillo : bone
bushel : peck
sheriff : jail (2)

M15. DAM : WATER

over : under
embargo : trade
curse : H2O
beaver : fish
river : stream (2)

M16. ALLAY : PAIN

damp : noise
create : noise
regain : consciousness
fray : edge
nerves : soothe (1)

M17. TILLER : SHIP

wheel : car
motor : truck
row : boat
kite : string
wing : plane (1)

M18. OIL : WELL

water : faucet
iron : ore
silver : mine
gas : tank
lumber : yard (3)
M19. YOKE : OX

saddle : stallion
tether : cow
herd : sheep
brand : steer
harness : horse  (5)

M20. DECIBEL : SOUND

calorie : weight
volt : electricity
temperature : weather
color : light
area : distance  (2)

M21. PHARMACIST : DRUGS

psychiatrist : ideas
mentor : drills
mechanic : troubles
chef : foods
nurse : diseases  (4)

M22. LUTE : STRING

flute : treble
xylophone : percussion
drum : rhythm
violin : concert
piano : octave  (2)

M23. BAY : SEA

mountain : valley
plain : forest
peninsula : land
cape : reef
island : sound  (3)

M24. RADIUS : CIRCLE

rubber : tire
bisect : angle
equator : earth
cord : circumference
spoke : wheel  (5)
M25. DEARTH : PAUCITY

few : many
scarcity : shortage
shortage : plethora
empty : container
commodity : expectation (2)
ANALOGIES: HARD ITEMS

H1. INTERRUPT: HECKLE

disrupt : intrude
tease : hector
maintain : uphold
condemn : implore
speech : performance (2)

H2. JUSTICE: SCALES

ruler : education
weather vane : cock
tree : farm
court : crime
pearl : credo (none)

H3. PEOPLE: ELECT

states : govern
debate : lawyers
teach : teachers
diplomats : judge
journalists : news (none)

H4. MUNDANE: TEMPORAL

earthly : heavenly
celestial : starry
spiritual : cavalier
angelic : religious
ephemeral : eternal (none)

H5. SEWER: SEWER

pickle : tank
lance : philosophy
hero : conquest
service : plaintiff
seed : spore (none)

H6. CANDID: DEVIOUS

unnerved : unhinged
unruffled : unnerved
unhinged : unspoken
unsullied : unruffled
overhanded : underhanded (none)
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APPENDIX E

COMPUTER PROGRAM FOR PRACTICE TEST I
REM PROGRAM - KAREN.BAS MR 03/20/89 *
REM PURPOSE - DISSERTATION PROGRAM *
REM REVISIONS - *
REM *****************************************************
REM ***** FUNCTIONS *****
%NOLIST
%INCLUDE PCSCRN.DEF
%LIST
DEF HHS.TO.S1.(TS)=3600*VAL(MIDS(TS,1,2))+60*VAL(MIDS(TS,3,2))+
VAL(MIDS(TS,5,2))
REM ***** MAIN LOGIC *****
DIM SUB.NO% (300)
CALL CLS
GOSUB DUS
CALL CLS
GOSUB STARTS
REPT: GOSUB MENU
GOSUB ACCEPT
IF OP$ = "2" THEN \ GOTO 999
IF OP$ = "5" THEN GOSUB SHOSCOR
IF OP$ NE "1" THEN GOTO REPT
FOR IX=1 TO 300
   SUB.NO%(IX)=0
NEXT IX
COUNTX=1
GOSUB OPENS
GOSUB GETSID
GOSUB PRACTEST
GOSUB INSTR1
GOSUB INSTR2
GOSUB ACCEPTY
IF (OP$ = "N" OR OP$ = "n") THEN GOSUB INSTR3
GOSUB READY

AVERAGE = .5
CX=0
NCORRECTX=0
ONCEZ=0
ETTOTX=0
FLAGX=0
STRTIMEX=TIMEX
REWZ=0

FOR NZ=1 TO 25

IF AVERAGE LE .68 THEN \ FL.NOZ=1:\ GOSUB PRESENT
IF AVERAGE GT .68 AND AVERAGE LT .78 THEN \ FL.NOZ=2:\ GOSUB PRESENT
IF AVERAGE GE .78 THEN \ FL.NOZ=3:\ GOSUB PRESENT

NCORRECTX=NCORRECTX+RIGHTX
N=NZ
NCORRECTX=NCORRECTX
NWRONGX=NX-NCORRECTX
AVERAGE=NCORRECTX/N

IF SIZX GE 100 AND SIZX LT 200 THEN \ IF \ (NCORRECTX=3 AND RIGHTX=1) OR \ (NCORRECTX=5 AND RIGHTX=1) OR \ (NCORRECTX=11 AND RIGHTX=1) OR \ (NCORRECTX=15 AND RIGHTX=1) THEN
gosub 100

IF (SIZX GE 200 AND SIZX LT 300) THEN \ IF \ (NWRONGX=1 AND RIGHTX=0) OR \ (NWRONGX=3 AND RIGHTX=0) OR \ (NWRONGX=5 AND RIGHTX=0) OR \ (NWRONGX=6 AND RIGHTX=0) \ THEN
gosub 200

IF SIZX GE 100 AND SIZX LT 200 THEN \ IF \ (FLAGX=1 AND RIGHTX=0) AND ONCEZ=0 \ THEN
gosub 300

IF (SIZX GE 200 AND SIZX LT 300) THEN \ IF \ (FLAGX=1 AND RIGHTX=1) AND ONCEZ=0 \ THEN
gosub 400
PRINT #4; NZ, ITEM$, OP$, RIGHT$, ETZ,REW$
REW%=0

NEXT NZ
FINITHE$=TIME$
GOSUB RECSTUFF
GOSUB CLOSER
GOSUB WTPFOREXP
GOTO REPT

REM ***** SUBROUTINES *****

DEFS: REM ***** INTITATIONALIZE ESCAPE STRINGS*****

BLACK$ = CHR$(27) + "[" + "37;40m"
BLUE$ = CHR$(27) + "[" + "37;44m" RED$ = CHR$(27) + "[" + "37;41m" GREEN$ = CHR$(27) + "[" + "37;42m" YELLOW$ = CHR$(27) + "[" + "37;43m"
MAGENTA$ = CHR$(27) + "[" + "37;45m" CYAN$ = CHR$(27) + "[" + "37;46m"
BORDER$=CHR$(27) + "[" + "33;44m" RESTORE$ = CHR$(27) + "[" + "0m" CLEAR.SCREEN$ = CHR$(27) + "[" + "1m"
BACK$=CHR$(27) + "[" + "2J" BOLD$ = CHR$(27) + "[" + "4m" BLINK$ = CHR$(27) + "[" + "5m" REVERSE$ = CHR$(27) + "[" + "7m" SCREEN40$ = CHR$(27) + "[" + "11m"
SCREEN80$ = CHR$(27) + "[" + "31m" SCREEN80B$ = CHR$(27) + "[" + "01m" SCREEN80W$ =
CHR$(27) + "[" + "21m" BELL$ = CHR$(07)
RETURN

OPENS: REM ***** OPEN SUBJECT DATA FILE*****
IF END #4 THEN GETOUT
OPEN "SCORES" AS 4

BACK:
READ #4; THEDATE$, SUB.NOZ(COUNTZ), AGE$, SEX$
FOR NZ=1 TO 25
READ #4; NZ,ITEM$, OP$, RIGHT$, ETZ,REW% NEXT NZ
COUNTZ=COUNTZ+1
READ #4; STRTIMES$, FINTIME$, TOTTIME$, ETTO% \ NCORRECTZ, AVERAGE
GOTO BACK

GETOUT:
OPEN "EASY" AS 1
OPEN "MEDIUM" AS 2
OPEN "HARD" AS 3
RETURN
STARTS: REM ***** PUT UP OPENING SCREEN ***** CONSOLE
CALL CLS
PRINT BORDER$
FOR IZ=0 TO 79
  CALL SETCUR(0,IZ)
  PRINT "*";
NEXT IZ
FOR IZ=0 TO 23
  CALL SETCUR(IZ,0)
  PRINT "*";
NEXT IZ
FOR IZ=0 TO 23
  CALL SETCUR(IZ,79)
  PRINT "*";
NEXT IZ
FOR IZ=0 TO 79
  CALL SETCUR(23,IZ)
  PRINT "*";
NEXT IZ
CALL SETCUR(3,32)
PRINT RESTORE$
CALL SETCUR(5,24)
PRINT BOLDS;"VERBAL REASONING ASSOCIATION TEST";RESTORE$ CALL
SETCUR(8,29)
PRINT "Administration Program"
CALL SETCUR(10,10)
PRINT ""
CALL SETCUR(11,10)
PRINT ""
CALL SETCUR(13,34)
PRINT "Version 3.0"
CALL SETCUR(14,10)
PRINT ""
CALL SETCUR(21,25)
PRINT "</Strike any key to continue.>";
WHILE NOT CONSTATX
  X%=-DUMMY%
WEND
  DX=-CONCHARX
RETURN

GETSID: REM ***** GET SUBJECT ID INFORMATION ***** CALL CLS
CONSOLE
AGAIN: CALL SETCUR(6,10)
      CALL ERAEO1
      INPUT "ENTER YOUR SUBJECT ID NUMBER..."; SIDX
IF SID% LT 100 OR SID% GT 400 THEN GOTO AGAIN
FOR J%-1 TO COUNT%
IF SID%=SUB.NO%(JI) THEN 
PRINT BOLD$ :
CALL SETCUR(20,15) :
PRINT "Subject ID already exists, Please re-enter";
PRINT RESTORE$ :
GOTO AGAIN
NEXT J%
CALL SETCUR(20,10)
CALL ERAEOL
AGAIN2: CALL SETCUR(7,10)
CALL ERAEOL
INPUT "ENTER YOUR AGE..."; AGE%
IF AGE% LT 15 OR AGE% GT 99 THEN GOTO AGAIN2
ALSO: CALL SETCUR(8,10)
CALL ERAEOL
INPUT "ENTER YOUR GENDER M/F"; SEX$
IF MATCH(SEX$,"HmFf",1) = 0 THEN GOTO ALSO
THEDATE$=DATE$
PRINT "14; THEDATE$, SID%, AGE%, SEX$
RETURN
MENU: REM ***** PUT UP MAIN MENU *****
CALL CLS
CONSOLE
CALL SETCUR(1,17)
PRINT "TEST MENU";
CALL SETCUR(5,17)
PRINT "CODE TEST FUNCTION...................";
CALL SETCUR(6,17)
PRINT "--- -----------------------------";
CALL SETCUR(7,17)
PRINT "1 Practice Test I.";
CALL SETCUR(8,17)
PRINT "2 Practice Test II.";
CALL SETCUR(9,17)
PRINT "3 Test Form - Individual.";
CALL SETCUR(10,17)
PRINT "4 Test Form - Group.";
CALL SETCUR(11,17)
PRINT "5 Score Analysis.";
CALL SETCUR(12,17)
PRINT "0 End program.";
RETURN
STOP
ACCEPT: REM **** ACCEPT INPUT **** REP:
CALL SETCUR(17,19)
CALL ERAEOL
PRINT "Please enter option....";
OP$=CHR$(CONCHARX)
IF MATCH(OP$,"1234567890",1) = 0 THEN\ GOSUB MISTK :\\ GOTO REP
IF OP$="O" THEN GOTO 999
RETURN
STOP

ACCEPTY: REM **** ACCEPT INPUT ****
REPLY: CALL ERAEOL
OP$=CHR$(INKEY)
IF MATCH(OP$,"yYnN",1) = 0 THEN GOTO REPY.
RETURN

PRACTEST: REM ***** ANOUNCES BEGINNING OF PRACTICE TEST *****
CALL CLS
CONSOLE
PRINT BOLD$;
CALL SETCUR(8,24)
PRINT "Practice Test 1";
PRINT RESTORE$
CALL SETCUR(22,20)
PRINT "<Strike any key to continue.>";
WHILE NOT CONSTAT%
Ja-DIJHHY%
WEND
D%-CONCHARX
RETURN

INSTR1: REM ***** FIRST SCREEN OF INSTRUCTIONS *****
CALL CLS
CONSOLE
CALL SETCUR(1,25)
PRINT "INSTRUCTIONS";
CALL SETCUR(5,10)
PRINT "Here is a description of the test items for you.";
CALL SETCUR(6,10)
PRINT "Each item requires that you solve an analogy.";
CALL SETCUR(7,10)
PRINT "Analogies are word relationships and as such should";
CALL SETCUR(8,10)
PRINT "be tackled with the same kind of attitude you have";
CALL SETCUR(9,10)
PRINT "for a crossword puzzle or a game of scrabble.";
CALL SETCUR(10,10)
PRINT "Each of these test questions begins with two";
CALL SETCUR(11,10)
PRINT "CAPITALIZED words which are related to each other";
CALL SETCUR(12,10)
PRINT "in some way. Your job is to figure out what";
CALL SETCUR(13,10)
PRINT "that relationship is and to select the two-word";
CALL SETCUR(14,10)
PRINT "answer that best expresses that same relationship.");
CALL SETCUR(22,20)
PRINT "<Strike any key to continue.>"
WHILE NOT CONSTAT%
    X%-DUHKY%
WEND
DUHH%-%INKEY
RETURN

INSTR2: REM ***** SECOND SCREEN OF INSTRUCTIONS ***** CALL CLS
CONSOLE
CALL SETCUR(1,25)
PRINT "EXAMPLE I";
CALL SETCUR(4,10)
PRINT "Here is an example:";
CALL SETCUR(6,15)
PRINT " CEDAR : WOOD";
CALL SETCUR(7,15)
PRINT ";
CALL SETCUR(8,15)
PRINT "1) pine : chest";
CALL SETCUR(9,15)
PRINT "2) mica : gold";
CALL SETCUR(10,15)
PRINT "3) copper : metal";
 CALL SETCUR(11,15)
PRINT "4) circle : cube";
CALL SETCUR(12,15)
PRINT "5) lynx : animal";
CALL SETCUR(18,10)
PRINT "Cedar is a particular kind of wood. The answer is (3)";
CALL SETCUR(19,10)
PRINT "because copper is a particular kind of metal and therefore";
CALL SETCUR(20,10)
PRINT "the two parts make an analogy. Do you understand how";
CALL SETCUR(21,10)
PRINT "to answer these items? Y/N? _";
RETURN

INSTR3: REM ***** THIRD SCREEN OF INSTRUCTIONS *****
CALL CLS
CONSOLE
CALL SETCUR(1,25)
PRINT "EXAMPLE II";
CALL SETCUR(4,10)
PRINT "Here is an another example:";
CALL SETCUR(6,15)
PRINT "SNAPSHOT : SCRAPBOOK";
CALL SETCUR(7,15)
PRINT "";
CALL SETCUR(8,15)
PRINT "1) memo : file";
CALL SETCUR(9,15)
PRINT "2) photograph : book jacket";
CALL SETCUR(10,15)
PRINT "3) camera : case";
CALL SETCUR(11,15)
PRINT "4) film : frame";
CALL SETCUR(12,15)
PRINT "5) career : portfolio";
CALL SETCUR(18,10)
PRINT "The answer is (1) because a SNAPSHOT is stored";
CALL SETCUR(19,10)
PRINT "for future reference in a SCRAPBOOK, in the same";
CALL SETCUR(20,10)
PRINT "way that a MEMO is stored in a FILE.";

CALL SETCUR(22,20)
PRINT "<Strike any key to continue.>"
WHILE NOT CONSTAT%
J(%-DUHHY%
WEND
D%-CONCHAR%
RETURN

READY: REM*** TELLS S TO GET READY ***
CALL CLS
CALL SETCUR(10,30)
PRINT "GET READY!";
CALL SETCUR(15,20)
IF $XZ$ GE 100 AND $XZ$ LT 200 THEN "
PRINT "Do your best to get the right answers."

IF ($XZ$ GE 200 AND $XZ$ LT 300) THEN PRINT "Do your best to avoid mistakes."

CALL SETCUR(22,20)
PRINT "<Strike any key to continue.>"
WHILE NOT CONSTAT$Z$
XX=DUM$YZ$
WEND
$XZ$=CONCHARZ
RETURN

MIST$X$: REM *****ERROR IN ENTRY*****
CALL SETCUR(22,20)
PRINT "ERROR-Please reenter."
RETURN

PRESENT: REM ***** PRESENTS ANALOGIES TO SUBJECT *****
CALL CLS
CONSOLE
CALL SETCUR(2,10)
PRINT "ITEM "; N%
READ #FL.NOX;ITEM$,STIM$,LN1$,LN2$,LN3$,LN4$,LN5$,ANSW$

CALL SETCUR(6,17)
PRINT STIM$;
CALL SETCUR(7,15)
PRINT ";
CALL SETCUR(8,15)
PRINT ". "; LN1$;
CALL SETCUR(9,15)
PRINT ". "; LN2$;
CALL SETCUR(10,15)
PRINT ". "; LN3$;
CALL SETCUR(11,15)
PRINT ". "; LN4$;
CALL SETCUR(12,15)
PRINT ". "; LN5$
REPANS: CALL SETCUR(18,15)
CALL ERASE
PRINT "ANSWER? ";
T1$=TIME$

OPS=CHR$(CONCHAR%) IF MATCH(OPS,"12345",1) = 0 THEN
goto REPANS

IF OPS=ANSW$ THEN RIGHT%=1 ELSE RIGHT%=0

T2$=TIME$
ETX=HMS.TO.SZ(T2$)-HMS.TO.SZ(T1$)
ETTOTX=ETTOTX+ETX
RETURN
STOP

100 REM ***** FEEDBACK FOR CONDITION 1 *****
CALL CLS
PRINT SCREEN40$
PRINT BELL$;
CALL SETCUR(9,16)
PRINT BOLD$:"Right!";
CALL SETCUR(11,8)
PRINT "Keep up the good work!";
PRINT RESTORE$
CALL SETCUR(22,6)
PRINT "<Strike any key to continue.>"
WHILE NOT CONSTATZ
XX=DUMMYZ
WEND
DX=CONCHARZ
FLAGZ=1
PRINT SCREEN80$;
REWZ=1
RETURN

200 REM ***** FEEDBACK FOR CONDITION 2 *****
CALL CLS
PRINT SCREEN40$
PRINT BELL$;
CALL SETCUR(9,16)
PRINT BOLD$;"Wrong!"
CALL SETCUR(11,1)
PRINT "Please be more careful to avoid errors."; PRINT RESTORE$;

CALL SETCUR(22,6)
PRINT "<Strike any key to continue.>"
WHILE NOT CONSTATZ
XX=DUMMYZ
WEND
DX=CONCHARZ
FLAGZ=1
PRINT SCREEN80$
REWZ=2
RETURN

300 REM ***** FEEDBACK FOR CONDITION 1 FOR 1ST RIGHT ANSWER *****
CALL CLS
PRINT SCREEN40$
PRINT BELL$;
CALL SETCUR(10,12)
PRINT BOLD$;"Incorrect answer."
ONCEZ=1
PRINT RESTORE$

CALL SETCUR(22,6)
PRINT "<Strike any key to continue.>" WHILE
NOT CONSTATZ
XX=DUMMYZ
WEND  
DZ=CONCHAR$  
PRINT SCREEN80$  
REWZ=2  
RETURN  

400  
REM ****** FEEDBACK FOR CONDITION 2 FOR 1ST RIGHT ANSWER *****  
CALL CLS  
PRINT SCREEN40$;  
PRINT BELL$;  
CALL SETCUR(10,12)  
PRINT BOLD$:"Correct answer.";  
PRINT RESTORE$  
ONCEZ=1  
CALL SETCUR(22,6)  
PRINT "<Strike any key to continue.>"  
WEND  
REM ****** BEGINNING OF LOOP *****  
C%=INKEY$  
IF (C% NE 14) AND (C% NE 25) THEN GOTO AROUND  
RETURN  

WTFOREXP:  
REM ****** WAIT FOR EXPERIMENTER ******  
CONSOLE  
CALL CLS  
CALL SETCUR(10,15)  
CALL PRTREV("Please get the experimenter.")  
AROUND:  
REM ****** BEGINNING OF LOOP *****  
C%=INKEY$  
IF (C% NE 14) AND (C% NE 25) THEN GOTO AROUND  
RETURN  

RECSTUFF:  
REM ****** RECORDS FINAL DATA *****  
TOTTIME$=HMS.TO.SZ(FINTIME$)-HMS.TO.SZ(STRTIME$)  
PRINT #4: STRTIME$, FINTIME$, TOTTIME$, ETTOTZ,\  
NCORRECTZ, AVERAGE  
RETURN  

SHOSCOR:  
REM ****** SHOW FINAL SCORE *****  
CALL CLS  
CONSOLE  
CALL SETCUR(22,20)
PRINT "<Strike any key to return to menu.>"

CALL SETCUR(3.27)
PRINT "CALCULATING CRITICAL FACTORS";

CALL SETCUR(4.27)
IF (CX=25) AND (NCORRECTX GT 16) THEN \ PRINT
"Using Raw Score = "; NCORRECTX;

IF (CX=25) AND (NCORRECTX LE 16) THEN \ PRINT
"Using Raw Score = 16";
FOR KZ=1 TO 1000
A=A+1
NEXT KZ
PRINT BOLD$;
PRINT BLINK$;
CALL SETCUR(7.27)
PRINT "CALCULATING FACTORS";
FOR KZ=1 TO 1000
A=A+1
NEXT KZ
PRINT RESTORE$
CALL SETCUR(9.30)
PRINT "A- 0.7502";
FOR KZ=1 TO 1000
A=A+1
NEXT KZ
CALL SETCUR(10.30)
PRINT "B- 0.4097";
FOR KZ=1 TO 1000
A=A+1
NEXT KZ
CALL SETCUR(11.30)
PRINT "C- 0.6731";
FOR KZ=1 TO 1000
A=A+1
NEXT KZ
CALL SETCUR(12.30)
PRINT "D- 0.6308";
FOR KZ=1 TO 1000
A=A+1
NEXT KZ
CALL SETCUR(13.30)
PRINT "E- 0.8902";
PRINT BLINK$;
CALL SETCUR(7.27)
CALL ERAEOL
PRINT BOLD$;
PRINT "CALCULATING SURGENCY";
FOR KZ=1 TO 3000
    A=A+1
NEXT KZ
PRINT RESTORE$
PRINT BOLD$
CALL SETCUR(9,40)
PRINT "*":
    FOR KZ=1 TO 3000
        A=A+1
    NEXT KZ
CALL SETCUR(11,40)
PRINT "**":
PRINT RESTORE$
CALL SETCUR(3,27)
CALL ERAEOL
CALL SETCUR(4,27)
CALL ERAEOL
CALL SETCUR(7,27)
CALL ERAEOL
PRINT "FINAL SURGENCY PROFILE"
CALL SETCUR(19,1)
PRINT "(Refer to 1988 Manual for interpretation.)";
CALL SETCUR(22,20)
PRINT "<Strike any key to return to menu.>";
WHILE NOT CONSTAT%
    X%=DUMMYZ
    WEND
DX=CONCHARZ
RETURN
CLOSER: REM ***** CLOSES ALL OPEN FILES ***** CLOSE 1,
         2, 3, 4
RETURN
999 REM END OF JOB
CALL CLS
STOP
END