

THE UNIVERSITY OF MANITOBA

EFFECTS OF TIME ORIENTATION,
ACTUAL CONTROLLABILITY, AND FICTIONAL PREDICTABILITY
ON PERCEIVED CONTROLLABILITY AND PERCEIVED PREDICTABILITY

by

GRACE TAN

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Abstract

The present study manipulated time orientation, actual controllability, and fictional predictability as defined by objective situations in order to investigate their effects on perceived controllability, predictability, confidence, and responsibility as measured by subjective ratings. A chance task was used in which 80 subjects obtained one of two discs marked with either a triangle or a circle (not made visible until the end of the study). Subjects were told that by obtaining the triangle they would win a prize. Time orientation was manipulated in terms of whether the disc was obtained before or after the dependent measures were taken. Actual controllability was manipulated in terms of whether or not subjects selected the disc. Fictional predictability was manipulated in terms of whether or not subjects were told which symbol represented winning. It was hypothesized (a) that a future time orientation and high actual controllability would interact to increase perceived controllability, confidence, and responsibility; (b) that a future time orientation and high fictional predictability would interact to increase perceived predictability and confidence; and (c) that high actual controllability and high fictional predictability would interact to increase perceived controllability, predictability, confidence, and responsibility. Results failed to confirm any of these hypotheses. Findings indicated an interaction among time orientation, actual controllability, and fictional predictability for perceived controllability. A

future as compared to a past time orientation resulted in greater perceived predictability. High as compared to low actual controllability resulted in greater perceived responsibility. Since no previous study combined the three independent variables with any of the dependent measures, comparisons although attempted, were considered speculative. Findings were interpreted in terms of the apparent complexity of the relationship between these three independent variables and the possible ineffectiveness of the high fictional predictability manipulation to enhance perceived controllability and predictability. Implications for future research and abstract theory were also discussed.

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CHAPTER I

LITERATURE REVIEW

Perhaps one of the most mystifying concepts of all time is time itself. For centuries time has been an enigma to the greatest of philosophers from St. Augustine to Emmanuel Kant to Bertrand Russell. Philosophers, however, are by no means the only breed of beings that have invested centuries of interest in the concept of time. Generations of the greatest of scientists have done likewise from Leibniz to Newton to Einstein. With the birth of psychology came yet another breed of beings interested in time. Until recently, however, psychologists have been interested primarily in the subjective experience of time (Doob, 1971; Fraisse, 1963; Rao, 1978).

Human beings seem to have a propensity to think, feel, and behave in a temporal frame of reference (Doob, 1971). It has been argued that human feelings cannot be experienced, discussed or analyzed without some reference to their temporal direction (Stern, 1938). Recently, there has been some interest among psychologists in the effects of time orientation, the direction of one's awareness on the continuum of time. A question to be answered is whether and how differences in one's time orientation towards an event can affect one's thoughts, feelings, or behaviors towards that event. There are as yet very few investigations in this area. One of the objectives of the present study is to investigate some of the effects of time orientation.

Much of human history is a product of the struggle for control and order. The preference for controllability and predictability may be a part of human nature, either ontogenetically or phylogenetically caused (Averill, 1973). Controllability can be defined in terms of the relationship between a response and an outcome (e.g., the driver steps on the brakes [response] and the vehicle stops [outcome]). Predictability can be defined in terms of the relationship between a stimulus and an outcome (e.g., the light turns red [stimulus] and the vehicle comes to a stop [response]). A controls B if A influences B, but A predicts B if A serves as an informational cue that B will occur (regardless of its influence or non-influence of B). The positive effects of controllability and predictability over aversive stimuli have been well documented along with the negative effects of uncontrollability and unpredictability (Averill, 1973; Mineka & Kihlstrom, 1978; Seligman, 1975).

In the struggle to control and predict life events people utilize experiences from the past and anticipate those in the future. Perceived controllability and perceived predictability can apply to both past as well as future event outcomes. Although we may think that we can only predict a future outcome, we can "predict" a past outcome in the sense that it may not yet be known to us. Similarly we can perceive whether the past outcome was controllable. Yet prediction and control tend to be associated with the future rather than the past because the past, even an unknown past, has already been determined and

can no longer be controlled or predicted in the usual sense. In as much as our perception of the past and that of the future may differ, perceived controllability and perceived predictability over an event may depend upon whether that event has already happened or is yet to happen. Investigations into this possibility are as yet lacking. Therefore, the present study aims to examine the variables of time orientation, controllability, and predictability.

Time

All psychological phenomena take place on a subjective continuum of time. For almost a century, psychologists have been engaged in time-related research. Compared to other areas in psychology, however, psychologists have invested relatively little interest in this area.

Time Perception

The perception of time is a basic and ongoing human experience. Its understanding is fundamental to the understanding of any problem of conscious experience (Weber, 1933). Temporal estimation is by far the most extensively investigated aspect of time perception. In general, results indicate that below a certain length, subjects tend to give over-estimations of a time interval. As the time interval increases in length, under-estimations occur and also increase in extremity. Many researchers have believed that there is, and have attempted to locate, an interval at which estimations tend to be correct (Kowalski, 1943; Loehlin, 1956; Rizende, 1952; Smythe & Goldstone,

1957). However, there has been little agreement among results. Some researchers have concluded that there is no single such interval for all subjects or for the same subject under different circumstances (Blakely, 1933; Scott, 1935; Trieman, 1963; Woodrow, 1951). Aside from the length of the temporal interval, other factors have been found to affect time estimation. Among these are the type and amount of mental and physical activity during the time interval. However, the results of studies on the effects of these factors have not been consistent either (Bakan, 1955; Clausen, 1950; Dobson, 1954; Rao & Sai Prasad, 1973).

Personality and Time Perception

A wide range of personality variables has recently been studied as possible determinants of time perception and estimation. Falk and Bindra (1954) investigated the effects of stress on time perception and found that under conditions of stress subjects made over-estimations of time intervals. Such results, however, were not found by Henrickson (1948). Johnson (1968) studied the effects of trait and state anxiety on time estimation. Results failed to show any relationships. Findings from Rao and Mythili (in press) indicate a greater estimation for elapsed time in the high manifest anxiety group compared to the moderate and low anxiety groups. There was no significant difference between these two latter groups. Lynn (1961) studied time judgement as a function of introversion and extraversion as measured by the Maudsley Personality Inventory.

Of the ten trials administered, no significant difference in time judgement was found for the first seven trials. However, a greater estimate was made by introverts in the last three trials. Eysenck (1959) found similar results in a single trial. However, results to the contrary were found by Du Preeze (1964). In all, results on the effects of personality variables on time perception have generally been inconsistent and inconclusive.

Psychopathology and Time Perception

Impairments of time perception have been found in some psychopathological states. Those suffering from psychotic depression usually perceive time as unpleasant (Payk, 1977). Various investigators have concluded that there is a defective and distorted sense of time associated with schizophrenia. Payk (1977) observed that this distortion of time in schizophrenics is characterized by a dissociation of chronological order. Seeman (1976) believes this defective time sense to be responsible for the manifested dysfunctions of reality testing in schizophrenics. Fernandez Zoila (1977) believes that the schizophrenic splitting of personality is associated with the breakdown of the normal time sequence such that the patient stands in contradictory positions with respect to time. Some schizophrenics seem to suffer from a complete loss of time, others from the fear of the loss of time (Rao, 1979). Studies comparing schizophrenics and normals in time estimation have shown inconsistent and inconclusive results (Dobson, 1954; Johnston, 1939; Rabin, 1957; Smythe & Goldstone, 1957). More recent investi-

gations have been lacking. Although there is evidence that a defective perception of time is associated with psychopathology, investigations into this area are few. The processes underlying manifested temporal distortions are not known.

Time Orientation and Predictability

Time orientation is the direction of one's awareness on the continuum of time. More specifically, time orientation to a given event can be defined as one's place on the continuum of time with respect to the given event. Research into this area has thus far been sparse and limited.

The temporal distance of future events and its effect on the intensity of personal involvement has been investigated (Ekman & Lundberg, 1971; Lundberg, von Wright, Frankenhaeuser, & Olson, 1974, 1975). Findings indicate that personal involvement decreases as a function of increasing temporal distance to an event. Lundberg and Ellonen (1977) studied the involvement of males and females in potential future events. Significant differences were found between the two sexes. Females tended to consider future events to be more important than males. They also tended to see the occurrence of negative events as more probable than positive ones.

Koenig (1979) compared the time orientation of internals and externals as measured by Rotter's I-E Scale. Findings confirmed his hypothesis that externals were more future oriented than internals. In as much as achievement motivation is an internal control, Koenig's (1979) findings seem to contradict those of

Agarwal and Tripathi (1978) which showed that achievement-oriented persons were future rather than past or present oriented.

Strickland, Lewicki, and Katz (1966) studied the effects of time orientation upon subjects' wagers on a chance event. In a series of dice-throwing trials, subjects in one group predicted each outcome and bet on it before they threw the dice, while those in another group postdicted each outcome and bet on it after they threw the dice. The hypothesis was confirmed that greater risk-taking in terms of the lower probability of their expected outcomes was found for subjects in the prediction group. However, no significant differences were found between the prediction and postdiction groups in either self-rated confidence or amount wagered over the expected outcome. Strickland et al. (1966) attributed the greater risk-taking by the prediction group to the possibility that one may tend to see a past chance event as "fated" or "sealed" compared to a future one, and thus have less perceived control. The preference for perceived control is found in risk-taking situations even when there is no realistic basis for it (Cohen, 1960).

In a similar study on prediction and postdiction, Rothbart and Snyder (1970) hypothesized that there should be a difference in the confidence levels between the prediction and postdiction groups even though Strickland et al. (1966) failed to find such a difference. They further suggested that a form of magical thinking might be responsible for the expected differences in confidence level between these two groups. They reasoned that

magical thinking, the attempt to "cause" an outcome by wishing, might be responsible for increasing one's estimate of the subjective probability of an outcome. Strickland et al. (1966) failed to find a difference in confidence level, they reasoned, because all subjects knew there would be 30 successive trials of dice-throwing and betting, so postdiction subjects could have been betting on the next outcome and employing magical thinking before the dice were thrown (which would then make the postdiction group comparable to the prediction group). In order to prevent magical thinking by the postdiction group, Rothbart and Snyder (1970) employed only one trial in which subjects rolled one die with the postdiction group unaware that they would later be betting on the outcome. As hypothesized, they found that subjects making predictions felt greater confidence and, in addition, bet more money and exhibited shorter bet latency than subjects making postdictions. Consistent with Strickland et al.'s finding that the prediction group exhibited greater risk-taking, Rothbart and Snyder found that this group bet more money than the postdiction group.

The temporal context of information has been found to affect both its detail and relative probability (Bavelas, 1973). When asked to give the itinerary of a trip taken by a third person in the past or future, responses for the past were found to be more detailed quantitatively (though not qualitatively). The responses for the future were, on the other hand, significantly more rare. They included places that were less probable.

These findings seem to be in agreement with Strickland et al. (1966) and Rothbart and Snyder (1970) in that more common or probable outcomes are estimated for past events (less risk-taking), while rarer or less probable outcomes are estimated for future events (greater risk-taking).

In a series of three experiments Fischhoff (1975) found that not only does knowing an outcome of a past event increase the perceived likelihood of the outcome, but also the judged relevance of the circumstances leading to the outcome. In addition, he found that people were unaware of this effect in that they believe the likelihood of the outcome would have been just as apparent to themselves and others had the outcome been unknown. In a further study Fischhoff and Beyth (1975) found that after event outcomes were known, people tended to remember their original predictions as more accurate than they had actually been. Thus it seems that people not only believe they can make just as accurate predictions without knowing an outcome but they also believe they are more accurate than they actually are.

Fischhoff (1976) performed another series of experiments in which he found no consistent differences between the judged likelihood of possible future versus past event outcomes presented by the experimenter when outcomes were not disclosed. In light of the Fischhoff (1975) results, this finding was attributed to the fact that no actual outcomes were given to the subjects. In addition, Fischhoff (1976) found no significant differences between the judged likelihood of future versus past event outcomes

when the outcomes were produced by the subjects themselves. These findings seem to contradict Rothbart and Snyder (1970) and Strickland et al. (1966). Fischhoff (1976) also found that when asked to generate a list of possible outcomes to a given event, past outcomes tended to be more imaginative and complex than future outcomes. This seems to contradict Bavelas' (1973) findings that past outcomes generated by subjects tended to be more common, less rare, and no more qualitatively detailed than future outcomes.

In all, studies on the effects of time orientation are not only limited but have been rather inconsistent in terms of both the methods employed and the results obtained.

Uncontrollability and Its Effects

As defined by Seligman (1975) uncontrollability occurs when an outcome is independent of a voluntary response. Seligman (1975) has claimed that uncontrollability produces cognitive, emotional, as well as motivational deficits in humans as well as in animals, a condition he termed "learned helplessness."

Hiroto and Seligman (1975) reported that college students who had been exposed to inescapable loud noise subsequently performed significantly poorer on anagram solving than subjects exposed to escapable loud noise and no loud noise. Miller and Seligman (1975) did a study involving college students on a "skill" task where successes and failures on each trial were prearranged without the subject's knowledge. Subjects were pretreated with escapable, inescapable, or no loud noise in a triadic design. The escapable group could terminate the noise

whenever they wanted. The inescapable group was yoked to the first group such that they received the loud noise exactly as the first group but had no control over the noise. The inescapable group showed no differences in their expectancy for success between trials on the "skill" task. The escapable group showed an increase in their expectancy for success following success and a decrease in their expectancy for success following failure. Miller and Seligman (1975) attributed these results to a cognitive set in the inescapable group preventing them from believing that success and failure was contingent on their response. The experience of response-outcome independence inherent in uncontrollability distorts the subsequent perception of response-outcome contingencies (Seligman, 1975).

Emotional deficits as a function of uncontrollability have generally been measured in terms of physiological and affective responses. Findings in this area, however, have not always been consistent. Geer and Maisel (1972) found a decrease in galvanic skin response for subjects who had control over an aversive stimulus. Findings have also shown a general decrease in GSR across subjects after repeated exposures to aversive stimuli (Glass & Singer, 1972). Hokanson, DeGood, Forrest, and Brittain (1971) administered shock to two groups of subjects. One group was allowed to take time-outs from shock when they wanted. The other group was yoked to the first group in that they received shocks and time-outs at the same time as the first group but had no control over when time-outs occurred. Consistent-

ly higher blood pressure was found for the yoked group throughout the experiment. Gatchel, Paulus, and Maples (1975) found greater reported feelings of depression, anxiety, and hostility in subjects exposed to inescapable noise.

Maiser and Seligman (1976) and Seligman (1975) have reported that exposures to uncontrollable aversive stimuli resulted in a reduction of attempts by the organism to control and adapt to other events. Hiroto (1974) found that exposing college students to inescapable loud noise resulted in the subsequent failure to escape noise in the finger shuttle box where the subject needed only to move his hand from one side of the box to the other. Subjects in this group simply sat and accepted the noise passively. Subjects who were exposed to no noise or to escapable noise learned readily to finger shuttle and escape the noise. Similar results were found by Hiroto and Seligman (1975), Krantz, Glass, and Snyder (1974), and Fosco and Geer (1971). Glass and Singer (1972) found that exposure to uncontrollable loud noise resulted in poor performance at proofreading, irritability, and giving up in problem solving. Subjects made to believe they had control over the loud noise did not show these deficits.

Types of Controllability

Seligman (1975) defines controllability in terms of response-outcome contingency. Many investigators have concluded that controllability is stress-reducing to an organism (Mandler & Watson, 1966; Sell, 1970). Averill (1973) distinguishes three different types of controllability: cognitive, decisional, and

behavioral.

Cognitive Control

Cognitive control involves the management of a potentially threatening event through the interpretation of it. This type of control may be further divided into information gain and appraisal. Information gain involves an objective, reality-based interpretation. Appraisal involves an interpretation which has been modified according to the needs and desires of the individual who has actively imposed meaning on an event. A preference for some information concerning an outcome, even when that outcome is unavoidable, has been found (Lanzetta & Driscoll, 1966; Monat, Averill, & Lazarus, 1972). Cognitive interpretation or appraisal of a situation or event can alter its perceived aversiveness and threat (Lazarus, 1966).

Decisional Control

Decisional control involves the opportunity for selection from a range or number of alternatives available to an individual. The availability of choices has been found to induce a sense of control which reduces the aversiveness of an aversive stimulus (Corah & Boffa, 1970).

Behavioral Control

Behavioral control involves the direct influence upon the environment in terms of action. Averill (1973) further partitions this type of control into regulated administration and stimulus modification. Regulated administration does not actually involve control over an event in terms of prevention

or escape. In this case control exists only over when or where an event occurs and who brings it about. Studies which have involved regulated administration of aversive stimuli have shown that subjects generally prefer self-administration and temporal certainty (Ball & Vogler, 1971; Lovibond, 1968; Pervin, 1963; Stotland & Blumenthal, 1964). Stimulus modification involves the ability to avoid, escape, take time out from, or otherwise limit the intensity of an aversive stimulus. As with other types of control these various manipulations of stimulus modification have generally been found to have modifying effects on aversive stimuli (Glass & Singer, 1972; Hokanson et al., 1971; Huston, 1972).

Controllability and Predictability

A distinction between controllability and predictability can be made (Nickels, Note 1), yet these two concepts have been confounded in previous studies. Although predictability does not necessarily involve controllability, controllability is often accompanied by predictability. Subjects who have control over the administration of a stimulus, for example, also have temporal certainty about the occurrence of that stimulus. Mineka and Kihlstrom (1978) have stated that some degree of predictability is inherent in controllability. However, Burger and Arkin (1980) showed that the degree of predictability and controllability need not covary across all situations. That is, situations exist where, although controllability is high, predictability may be low, and vice versa. A useful distinction (Nickels, Note 1) may be that

controllability implies a person's capability of influencing an outcome, that is, making an impact on an outcome by affecting its likelihood of occurrence (regardless of whether one can take account of this impact in making a forecast of the outcome); whereas predictability implies a person's capability of anticipating an outcome, that is, making a forecast of an outcome by taking account of its likelihood of occurrence (regardless of whether one can make an impact on the outcome).

Seligman (1975) believes that controllability has the more important role in the production of learned helplessness even though predictability can reduce fear and anxiety. However, Averill (1973) believes that it is the element of predictability inherent in controllability rather than controllability itself that facilitates stress-reduction.

In an attempt to separate controllability and predictability, Geer and Maisei (1972) administered aversive visual stimuli to three groups of subjects. For one group a button was available through which subjects could control (terminate) the aversive stimuli. Another group was given predictability in terms of information on the duration of the aversive stimuli. For both of these groups there was a warning tone 10 seconds before the onset of the aversive stimuli. Thus, both these groups had predictability but only the first group had controllability over the aversive stimuli. A third group had neither controllability nor predictability. A lower GSR towards the aversive stimuli was found for the group that had control than for either of the other two groups. In addition, more preference was

indicated for controllability than for predictability. Geer and Maisel (1972) concluded that the effects of controllability cannot be attributed to predictability alone. Unfortunately, there was no group with controllability but without predictability.

Schulz (1976) did a study involving old people in nursing homes as subjects. Three groups of subjects received visits from individuals arriving on a predictable, controllable and predictable, or random schedule. Both the predictable schedule and the controllable and predictable schedule resulted in positive behavioral changes not found for the random group. No significant difference in amount of positive changes was found between the predictable group and the controllable and predictable group.

A recent attempt to isolate the effects of controllability and predictability was made by Burger and Arkin (1980) in an experiment involving a learned helplessness situation. Four groups of subjects were exposed to one of four combination of controllable or uncontrollable and predictable or unpredictable loud noise while solving anagram problems. The controllable-predictable group could immediately terminate the loud noise by solving an anagram correctly. The controllable-unpredictable group was told they could reduce an unknown duration of loud noise in half by solving an anagram correctly. The controllable-predictable group therefore had predictability over the offset of the noise while the controllable-unpredictable group did not. The uncontrollable-predictable and the uncontrollable-unpredictable groups solved anagram problems while the noise was presented

but were not told they could control the noise in any way. For the uncontrollable-predictable group, the noise was presented at a set interval. For the uncontrollable-unpredictable group, the stimulus was presented at differing intervals and in differing lengths. All groups received the same amount of noise. A control group was also included where no noise blasts were presented. All subjects were subsequently given a memory task. Significantly poorer performance on the memory task was found for the uncontrollable-unpredictable group only, along with a greater depressive affect. Results indicate that either controllability or predictability by itself can mitigate the negative effects of an aversive stimulus. In this sense, then, both controllability and predictability are important variables. An additional finding was that a high desire for control resulted in significantly poorer performance on the memory task than a low desire for control.

Perceived Controllability and Perceived Predictability

Seligman (1975) has stated that it is not the uncontrollability of events per se that results in learned helplessness, but rather, the perception that events are uncontrollable. Lefcourt (1973) after a review of the literature on the stress-reducing effects of controllability said that "... the sense of control, the illusion that one can exercise personal choice, has a definite and positive role in sustaining life" (p.424). The perception of controllability and predictability may be the crucial factor involved in stress-reduction or the mitigation of any negative effects of aversive stimuli.

However, perceived controllability/predictability can be "presumed" (as well as "verified") and can even be "fictional" (as well as "actual"). In fact, the case has been made (Nickels, Note 2) that any so-called "illusion" of control or prediction is based on someone perceiving a fictional relationship to be actual either because of an unverified presumption on the person's part or because evidence is falsified in some way so verification although available is inaccurate. In other words, a controllable/predictable situation can involve perceived controllability/predictability with or without actual controllability/predictability. Thus, a consideration of the situational manipulation of perceived controllability/predictability becomes important.

Studies involving the manipulation of perceived controllability and predictability have generally failed to distinguish between, or control for, verified versus presumed controllability/predictability. In some studies (e.g., Glass & Singer, 1972) subjects in the controllable condition were told only that they could terminate an aversive stimulus and had no verification of their alleged control, while in other studies (e.g., Burger & Arkin, 1980) subjects in one of the controllable conditions actually terminated -- and verified that they terminated -- an aversive stimulus by performing a specific task. In fact, even the manipulation of controllability/predictability in a single experiment may not be consistent, as in the Burger & Arkin (1980) study where subjects had verified controllability

in one condition but only presumed controllability in another. Finally, many studies manipulating actual controllability have failed to measure perceived controllability (e.g., Burger & Arkin, 1980; Geer & Maisel, 1972; Lerner & Matthews, 1967) or perceived predictability (e.g., Geer & Maisel, 1972; Lerner & Matthews, 1967; Wortman, 1975).

Since actual control in terms of a response-outcome contingency is not a prerequisite for perceived control (Seligman, 1975), it is perhaps not surprising to find that the human desire for control of a chance-determined outcome may result in the perception of controllability where none is possible (Langer, 1977). Langer (1977) has found this "illusion of control" in a number of chance situations. However, of most relevance to the present study are two investigations which introduced actual controllability without actual predictability (Lerner & Matthews, 1967; Wortman, 1975).

In the Lerner and Matthews study (1967), pairs of subjects were told that one of them would end up receiving a shock and the other a more desirable outcome depending on which of two slips of paper (indicating their fate) each picked out of a bowl. Subjects "picking first" determined not only their own fate but also the fate of their partner who was left with the remaining slip ("fates interdependent" condition). In the "fates independent" condition subjects were asked to pick from a bowl full of slips, half of which represented the shock condition and half the desirable condition. In the "fates interdependent"

condition, subjects were found to attribute the responsibility for their fates to whoever picked first. In the "fates independent" condition subjects attributed responsibility for their fates to themselves. These findings indicate that a sense of responsibility and possibly perceived controllability can result from bringing about a behavioral outcome in an unforecastable situation.

In a somewhat similar study Wortman (1975) explored the possibility that "causing" an outcome in a chance situation can induce perceived control, choice, and responsibility. In addition, Wortman (1975) believed that another possible determinant of perceived control was "foreknowledge" of the desired outcome. After subjects rated the desirability of a number of consumer items, they were told that two of the previously rated items would be available and that they would have the opportunity to obtain one of them. Of the two available items one had been previously rated by the subject as desirable, the other less so. Subjects were told that whichever item they obtained would be randomly determined in that subjects would be blindly selecting from a coffee can either a red or a blue marble (each of which represented one of the two items). For one group the experimenter selected the marble, and subjects were told beforehand which colored marble represented which item (experimenter-caused-foreknowledge condition). A second group of subjects picked the marble themselves and were also told beforehand which colored marble represented which item (self-caused-foreknowledge

condition). A third group also picked the marble themselves but were told they would not find out which colored marble represented which item until later (self-caused-no foreknowledge condition). Results showed that compared to subjects in the other two groups, those in the self-caused-foreknowledge condition reported significantly greater (a) feelings of control over which colored marble they obtained, (b) feelings of choice about which item they obtained, and (c) feelings of responsibility for getting the item they obtained. Subjects in the experimenter-caused-foreknowledge and those in the self-caused-no foreknowledge conditions did not differ significantly on any of the three dependent measures. Wortman (1975) concluded that neither causality nor foreknowledge alone had an affect. However, since Wortman (1975) failed to include a no causality-no foreknowledge condition, this conclusion may be premature, for causality alone or foreknowledge alone might have been sufficient to generate a significantly greater sense of control, choice, and responsibility than when there was neither causality nor foreknowledge.

In Wortman's study (1975) the manipulation of causality can be seen as the manipulation of actual or behavioral control (Averill, 1973), whereas the manipulation of foreknowledge can be seen as the manipulation of foreknowledge of event-outcome contingencies without the knowledge of which event occurs, i.e., fictional predictability. In the latter case, knowing ahead of time which colored marble goes with which outcome may have increased one's knowledge of event-outcome contingencies, but it did not increase one's

actual controllability or actual predictability. Nevertheless, perceived control seems to be facilitated when foreknowledge is combined with causality.

Present Study

Time, Controllability, Predictability

Rothbart and Snyder (1970) and Strickland et al. (1966) have suggested that the effect of time orientation on one's perceived confidence over an event outcome is a result of our tendency to perceive more control over the future than the past even when no actual control is or was possible. If this is the case, then greater perceived controllability, perceived confidence, and perhaps even perceived predictability might be expected towards future than past event outcomes.

However, in both of the above studies subjects threw the dice (or die) themselves. Therefore, although their control over the chance-determined outcome would be classified as fictional, the subjects may have presumed that their "throwing" was influential, leading to an "illusion of control" (Langer, 1977). Unfortunately, neither study required subjects to make predictive and postdictive evaluations when the experimenter threw the dice (or die), so no test of this self throw/other throw effect was possible. Still it may be that a future time orientation as compared to a past time orientation promotes greater perceived controllability only in a situation which provides information allowing the subject to presume some element of personal control. Or, extending this reasoning somewhat further, one

might expect that only in a situation which provides information allowing the subject to presume some element of personal prediction will a future time orientation as compared to a past time orientation promote greater perceived predictability. Again, unfortunately, this effect could not be tested, for neither of the above studies obtained any measure of perceived predictability. Therefore, the present study is an attempt to clarify these issues by including situational manipulations of time orientation (Rothbart & Snyder, 1970; Strickland et al. 1966), actual controllability (Burger & Arkin, 1980; Lerner & Matthews, 1967; Wortman, 1975), and fictional predictability (Wortman, 1975).

Controllability and Predictability

As indicated previously, Wortman (1975) found that only a situation providing both actual controllability and fictional predictability facilitated perceived controllability and responsibility (cf. Burger & Arkin, 1980). It may be reasonable, however, to extend the above analysis to other variables. For example, the combination of actual controllability and fictional predictability may similarly facilitate perceived predictability and confidence. Unfortunately, Wortman (1975) failed to measure perceived predictability and confidence; and Lerner & Matthews (1967) failed to measure perceived controllability, predictability, and confidence, as well as failed to manipulate fictional predictability. Therefore, the present study is an attempt to extend the limits of prior controllability/predictability studies using all of the above variables in a single study.

Summary of Variables

The present study attempted to manipulate time orientation, actual controllability, and fictional predictability as defined by objective situations in order to investigate their effects on perceived controllability, predictability, confidence, and responsibility as measured by subjective ratings. To accomplish this, a chance situation was used in which time orientation was manipulated in terms of when an outcome occurs; actual controllability was manipulated in terms of one's actual influence over which outcome occurs (Lerner & Matthews, 1967; Wortman, 1975); and fictional predictability was manipulated in terms of the information one receives about event-outcome contingencies (Wortman, 1975).

All dependent variables were measured by the use of a questionnaire. In Rothbart and Snyder (1970), subjects were asked to select one of six chance-determined outcomes and then rate how confident they were that their chosen outcome would occur. In the present study, subjects were asked to rate how confident they were that a particular outcome selected by the experimenter would occur. This change should prevent an illusion of control which can be produced when subjects choose their own outcome to evaluate (Langer, 1977).

Hypotheses

From the above discussion of Rothbart and Snyder (1970) and Strickland et al. (1966) it was hypothesized that time orientation and actual controllability will interact to influ-

ence a person's perceived controllability, which in turn will influence one's perceived confidence and responsibility. Similarly, it was hypothesized that time orientation and fictional predictability will interact to influence a person's perceived predictability, which in turn will influence one's perceived confidence. Finally, based on the discussion of Wortman (1975) it was hypothesized that actual controllability and fictional predictability will interact to influence both a person's perceived controllability and perceived predictability, which in turn will influence one's perceived confidence and responsibility. Hence, the following specific hypotheses were advanced for each of the four dependent variables:

Perceived controllability. The hypotheses for this dependent variable are:

Hypothesis 1. The combination of time orientation and actual controllability will interact such that perceived controllability will increase as one proceeds (a) from past to future time orientation under high actual controllability and (b) from low to high actual controllability under a future time orientation.

Hypothesis 2. The combination of actual controllability and fictional predictability will interact such that perceived controllability will increase as one proceeds (a) from low to high actual controllability under high fictional predictability and (b) from low to high fictional predictability under high actual controllability.

Perceived predictability. The hypotheses for this dependent variable are:

Hypothesis 3. The combination of time orientation and fictional predictability will interact such that perceived predictability will increase as one proceeds (a) from past to future time orientation under high fictional predictability and (b) from low to high fictional predictability under a future time orientation.

Hypothesis 4. The combination of actual controllability and fictional predictability will interact such that perceived predictability will increase as one proceeds (a) from low to high actual controllability under high fictional predictability and (b) from low to high fictional predictability under high actual controllability.

Perceived confidence. The hypotheses for this dependent variable are:

Hypothesis 5. The combination of time orientation and actual controllability will interact such that perceived confidence will increase as one proceeds (a) from past to future time orientation under high actual controllability and (b) from low to high actual controllability under a future time orientation.

Hypothesis 6. The combination of time orientation and fictional predictability will interact such that perceived confidence will increase as one proceeds (a) from past to future time orientation under high fictional

predictability and (b) from low to high fictional predictability under a future time orientation.

Hypothesis 7. The combination of actual controllability and fictional predictability will interact such that perceived confidence will increase as one proceeds (a) from low to high actual controllability under high fictional predictability and (b) from low to high fictional predictability under high actual controllability.

Perceived responsibility. The hypotheses for this dependent variable are:

Hypothesis 8. The combination of time orientation and actual controllability will interact such that perceived responsibility will increase as one proceeds (a) from past to future time orientation under high actual controllability and (b) from low to high actual controllability under a future time orientation.

Hypothesis 9. The combination of actual controllability and fictional predictability will interact such that perceived responsibility will increase as one proceeds (a) from low to high actual controllability under high fictional predictability and (b) from low to high fictional predictability under high actual controllability.

CHAPTER II

METHOD

Subjects

Subjects were 80 introductory psychology students participating in the study for experimental credit. There were 10 subjects, five males and five females, randomly assigned to each of eight experimental conditions (see Table 1). The subjects were run individually in sessions of approximately 15 minutes each.

Overview

Subjects were told that the purpose of the present study was to investigate the psychological characteristics of winners and losers. To provide incentive, subjects knew ahead of time that they would receive a small prize if they succeeded at the experimental task. The experimental task involved a chance event (obtaining a disc) with two possible outcomes, one desirable and one undesirable. To prevent magical thinking in the past time orientation conditions (Rothbart & Snyder, 1970), the experiment consisted of one trial for all subjects.

Two levels of each of three dimensions -- past or future time orientation (PT or FT), high or low actual controllability (HC or LC), and high or low fictional predictability (HP or LP) -- were varied factorily in a 2x2x2 design. Time orientation was manipulated in terms of when the disc was obtained, that is, whether the disc was obtained before the experimental manipulations or after the administration of a

Table 1
Sequence of Events

Introduction to the study: E shows discs to S

Obtaining the Disc (Past time orientation conditions only):
S selects the disc (condition 1 & 2) or gets the disc
which drops out first (condition 3 & 4)

Instructions

Time, Controllability, & Predictability Manipulations:

E reminds S that S already selected the disc	S knows the winning symbol (condition 1: PT/HC/HP)
	S does not know the winning symbol (condition 2: PT/HC/LP)

E reminds S that S got the disc which dropped out first	S knows the winning symbol (condition 3: PT/LC/HP)
	S does not know the winning symbol (condition 4: PT/LC/LP)

E tells S that S will select the disc	S knows the winning symbol (condition 5: FT/HC/HP)
	S does not know the winning symbol (condition 6: FT/HC/LP)

E tells S that S will get the disc which drops out first	S knows the winning symbol (condition 7: FT/LC/HP)
	S does not know the winning symbol (condition 8: FT/LC/LP)

Questionnaire

Obtaining the disc (future time orientation conditions only):
S selects the disc (condition 5 & 6) or gets the disc
which drops out first (condition 7 & 8)

Conclusion to the Study

questionnaire which measured the dependent variables. Actual controllability was manipulated by giving or withholding personal influence over obtaining the disc, that is, whether the subject or chance influenced which was the subject's disc. Fictional predictability was manipulated by giving or withholding information on the specific symbol-outcome contingency, that is, whether or not the subject was told which of two symbols represented winning.

Procedure

The experiment proceeded according to a preset sequence of events. See Table 1 for a summary of the sequence of events for each condition, and see Appendix A for the exact instructions given subjects in each of the eight conditions.

Introduction to the Study

Each subject was seated at a table opposite the experimenter, who drew attention to two black wooden discs approximately one inch in diameter.

I have here two wooden discs on which markings have been made using an invisible ink which can be made visible under the ultraviolet light of this lamp. [E turns on lamp.] Notice that one of these discs is marked with a triangle and the other with a circle.

By showing these markings to the subjects, they knew that there was actually a different identifying mark on each of the two discs. The ultraviolet lamp was then turned off and the two discs put inside a sealed coffee can. The inside of the coffee can was shown to the subject.

Obtaining the Disc (Past Time Orientation Only)

After subjects had been introduced to the study, those under the PT conditions obtained one of the two discs. The experimenter shook the coffee can vigorously to mix up the discs inside. Then the experimenter blindly dropped the discs out of the can through an opening large enough for only one disc at a time to drop through. Subjects in the PT/HC/HP and PT/HC/LP conditions were asked to select and keep in their hands one of the two discs. Subjects in the PT/LC/HP and PT/LC/LP conditions were asked to take and keep in their hands the disc that came out first. At the time the PT subjects obtained a disc, they had no knowledge that the disc they got determined whether they would win or lose. Hence there could have been no magical thinking for subjects under these four conditions.

Instructions

At this point all subjects received the following instructions:

The purpose of this study is to investigate the psychological characteristics of winners and losers before they actually learn whether they have become winners or losers. In this experiment, all subjects are given one opportunity to win a prize. As you have seen, one of these two discs is marked with a circle and the other with a triangle.

Time, Controllability, and Predictability Manipulations

The experimental manipulations were implemented as follows:

1. PT/HC/HP. Subjects in this condition were told, "the discs have been shaken vigorously inside this can, then blindly dropped one at a time onto the table. You have already been asked

to pick one of the discs and keep it in your hand. In order for you to be the winner of a prize, the symbol on the disc you picked must be the symbol written in invisible ink on this card. [E turns on ultraviolet lamp and shows S the card.] Notice that the symbol on the card is a triangle. At the end of the experiment, the symbol on the disc you picked will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box." The controllability manipulation in this condition, and in all other past orientation conditions, was actually a reminder of the subject's prior selection or lack of selection of the disc.

2. PT/HC/LP. Subjects in this condition were told, "The discs have been shaken vigorously inside this can, then blindly dropped one at a time onto the table. You have already been asked to pick one of the discs and keep it in your hand. In order for you to be the winner of a prize, the symbol on the disc you picked must be the symbol written in invisible ink on this card. The symbol on this card will not be shown to you until the end of the experiment. At the end of the experiment, the symbol on the disc you picked will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box."

3. PT/LC/HP. Subjects in this condition were told, "The discs have been shaken vigorously inside this can, then blindly dropped one at a time onto the table. You have already been asked to keep in your hand the first disc that dropped out of the can.

In order for you to be the winner of a prize, the symbol on the disc given you must be the symbol written in invisible ink on this card. [E turns on ultraviolet lamp and shows S the card.] Notice that the symbol on the card is a triangle. At the end of the experiment, the symbol on the disc given you will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box."

4. PT/LC/LP. Subjects assigned to this condition were told, "The discs have been shaken vigorously inside this can, then blindly dropped one at a time onto the table. You have already been asked to keep in your hand the first disc that dropped out of the can. In order for you to be the winner of a prize, the symbol on the disc given you must be the symbol written in invisible ink on this card. The symbol on this card will not be shown to you until the end of the experiment. At the end of the experiment, the symbol on the disc given you will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box."

5. FT/HC/HP. Subjects in this condition were told, "The discs will be shaken vigorously inside this can, then blindly dropped one at a time onto the table. You will be asked to pick one of the discs and keep it in your hand. In order for you to be the winner of a prize, the symbol on the disc you pick must be the symbol written in invisible ink on this card. [E turns on the ultraviolet lamp and shows S the card.] Notice that the symbol on the card is a triangle. At the end of the

experiment, the symbol on the disc you pick will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box."

6. FT/HC/LP. Subjects in this condition were told, "The discs will be shaken vigorously inside this can, then blindly dropped one at a time onto the table. You will be asked to pick one of the discs and keep it in your hand. In order for you to be the winner of a prize, the symbol on the disc you pick must be the symbol written in invisible ink on this card. The symbol on this card will not be shown to you until the end of the experiment. At the end of the experiment, the symbol on the disc you pick will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box."

7. FT/LC/HP. Subjects in this condition were told, "The discs will be shaken vigorously inside this can, then blindly dropped one at a time onto the table. You will be asked to keep in your hand the first disc that drops out of the can. In order for you to be the winner of a prize, the symbol on the disc given you must be the symbol written in invisible ink on this card. [E turns on ultraviolet lamp and shows S the card.] Notice that the symbol on the card is a triangle. At the end of the experiment, the symbol on the disc given you will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box."

8. FT/LC/LP. Subjects assigned to this condition were told, "The discs will be shaken vigorously inside this can, then blindly

dropped one at a time onto the table. You will be asked to keep in your hand the first disc that drops out of the can. In order for you to be the winner of a prize, the symbol on the disc given you must be the symbol written in invisible ink on this card. The symbol on this card will not be shown to you until the end of the experiment. At the end of the experiment, the symbol on the disc given you will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box."

Questionnaire

After subjects received the specific manipulations for their respective conditions, they were asked to fill out a 10-item questionnaire. (See Appendices B & C.) Subjects under the PT conditions were administered a different version of the questionnaire (with appropriate tense changes) from those under the FT conditions.

The questionnaire included three measures of perceived controllability (questions 3, 4, & 8), two of perceived predictability (questions 2 & 7), one of perceived confidence (question 10), and one of perceived responsibility (question 5a). The three measures of perceived controllability included controllability over symbol, over disc, and over outcome, respectively; while the measures of perceived predictability included predictability over the symbol and the outcome but not the disc, because the discs were only distinguishable in terms of their symbols or the outcomes associated with these symbols. Ques-

tions 5b and 5c were distraction items and were not analysed. The measure of wanting to win (question 9) was included in order to check subjects' motivation levels. The measure of symbol expectancy (question 1) was included in order to add to subject involvement and to provide a further check on subject motivation. The measure of instructional recall (question 6a & b) served as a criterion for inclusion in the study. That is, subjects had to show that they remembered the manipulation of fictional predictability or else be eliminated from the study. Only one subject failed to fulfill this criterion, and a replacement was randomly selected.

Obtaining the Disc (Future Time Orientation Only)

After subjects had completed the questionnaire, those under the FT conditions obtained one of the two discs. The experimenter shook the coffee can vigorously to mix up the discs inside. Then the experimenter blindly dropped the discs out of the can through an opening large enough for only one disc at a time to drop through. Subjects in the FT/HC/HP and FT/HC/LP conditions were asked to select and keep in their hands one of the two discs. Subjects in the FT/LC/HP and FT/LC/LP conditions were asked to take and keep in their hands the disc that came out first.

Conclusion to the Study

At this point all subjects who were in the LP conditions were shown under the ultraviolet lamp the symbol written in invisible ink on the card. All subjects were

shown under the ultraviolet lamp the symbol on the disc in their hands. Those whose disc bore the winning symbol won a ball point pen as their prize. (They had not known what the prize was before this.) All subjects were then debriefed. They were told that the purpose of the experiment was to study certain aspects of prediction and control. More specifically, the purpose was to determine whether people can develop any sense of controllability and predictability given a chance situation. Subjects were then thanked, given their experimental credit, and asked not to discuss any part of the experiment with anyone.

CHAPTER III

RESULTS

The interaction effects hypothesized for each of the dependent variables would not permit the use of an a priori analysis, since the set of comparisons needed to test these interactions would not be orthogonal. Hence, a 3-way ANOVA (with time orientation, actual controllability, and fictional predictability as independent variables) was performed for each of the four dependent variables using .05 as the level of significance. Where tests of simple main effects, simple main effects, and/or simple interaction effects were needed, the .05 level was partitioned by the number of tests performed for each "Sum of Squares" family (Kirk, 1968).

Each of the nine hypotheses involves a different 2-way interaction. Table 2 summarizes the hypotheses as they apply to each dependent variable.

Perceived Controllability Over Symbol

Results of the 3-way ANOVA (see Table 3) for perceived controllability over the symbol (question 3 in Appendices B & C) fail to confirm hypothesis 1, since the expected 2-way interaction between time orientation and actual controllability is non-significant. Results also fail to confirm hypothesis 2, since the expected 2-way interaction between actual controllability and fictional predictability is non-significant.

However, the time main effect is significant, with $F(1, 72)$

Table 2
Hypotheses Tested for Each Dependent Variable

Perceived Controllability		Perceived Predictability	
Hypothesis Tested	Interaction Hypothesized	Hypothesis Tested	Interaction Hypothesized
1	Time x Control ^a	3	Time x Predict ^c
2	Control x Predict ^b	4	Control x Predict ^b
Perceived Confidence		Perceived Responsibility	
Hypothesis Tested	Interaction Hypothesized	Hypothesis Tested	Interaction Hypothesized
5	Time x Control ^a	8	Time x Control ^a
6	Time x Predict ^c	9	Control x Predict ^b
7	Control x Predict ^b		

Note. A 3-way ANOVA was performed on each of the three measures of perceived controllability, on each of the two measures of perceived predictability, and on each single measure of perceived confidence and perceived responsibility.

^a The magnitude of the dependent variable will increase as conditions vary from PT to FT at HC and from LC to HC at FT.

^b The magnitude of the dependent variable will increase as conditions vary from LC to HC at HP and from LP to HP at HC.

^c The magnitude of the dependent variable will increase as conditions vary from PT to FT at HP and from LP to HP at FT.

Table 3
Summary of 3-Way ANOVA
for Perceived Controllability Over Symbol

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Time (A)	1	24.200	4.714	0.033
Control (B)	1	3.200	0.623	0.432
Predict (C)	1	1.800	0.351	0.556
A x B	1	1.800	0.351	0.556
A x C	1	1.800	0.351	0.556
B x C	1	0.200	0.039	0.844
A x B x C	1	39.200	7.636	0.007
Residual	72	5.133		

= 4.714, $p = 0.033$, and the 3-way interaction is significant, with $F(1, 72) = 7.636$, $p = 0.007$. Tests of significance performed on the simple interaction effects (Kirk, 1968) show that the magnitude of this dependent measure increases significantly as one proceeds (a) across different combinations of time orientation and actual controllability under high fictional predictability, $F(1, 72) = 5.630$, $p < 0.025$; and (b) across different combinations of time orientation and fictional predictability under high actual controllability, $F(1, 72) = 5.630$, $p < 0.025$. (Figure 1 demonstrates the interaction effects.) No other main or interaction effects are significant beyond the .05 level. (Table 4 gives the means and standard deviations for each condition.)

Perceived Controllability Over Disc

Results of the 3-way ANOVA (see Table 5) for perceived controllability over the disc (question 4 in Appendices B & C) fail to confirm hypothesis 1, since the expected 2-way interaction between time orientation and actual controllability is non-significant. Although the expected 2-way interaction between actual controllability and fictional predictability is significant with $F(1, 72) = 5.091$, $p = 0.024$, hypothesis 2 fails to be confirmed. Tests of significance performed on the simple main effects (Kirk, 1968) show that the magnitude of this dependent measure increases significantly as one proceeds (a) from low to high actual controllability under low fictional predictability, with $F(1, 72) = 10.581$, $p < 0.0125$; and (b) from high to low fictional predictability under high actual controllability,

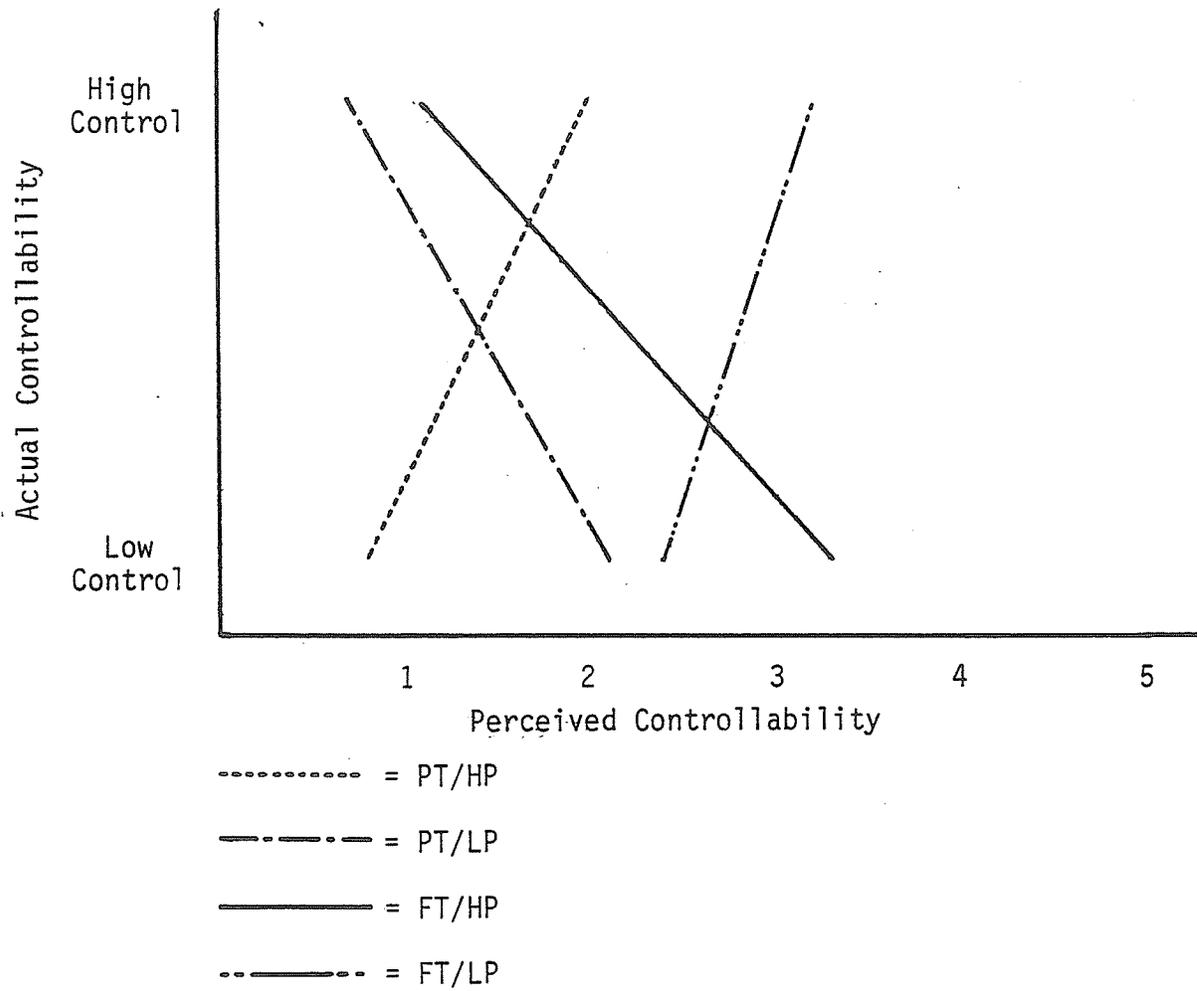


Figure 1. Interaction effect for perceived controllability over symbol.



Table 4
Means and Standard Deviations
for Perceived Controllability

Condition	Over Symbol		Over Disc		Over Outcome	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
1. PT/HC/HP	2.00	2.829	2.40	2.989	2.30	2.710
2. PT/HC/LP	0.70	1.338	4.40	3.502	2.00	2.211
3. PT/LC/HP	0.80	1.687	0.80	1.687	0.40	1.265
4. PT/LC/LP	2.10	2.080	1.60	1.713	1.70	1.829
5. FT/HC/HP	1.10	1.853	1.10	1.853	1.00	2.108
6. FT/HC/LP	3.20	2.573	4.70	2.791	3.80	2.251
7. FT/LC/HP	3.30	2.800	2.70	2.710	2.50	2.953
8. FT/LC/LP	2.40	2.503	2.30	2.359	2.00	1.491
Total	1.95	2.365	2.5	2.761	1.963	2.281

Table 5
 Summary of 3-Way ANOVA
 for Perceived Controllability Over Disc

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Time (A)	1	3.200	0.501	0.481
Control (B)	1	33.800	5.291	0.024
Predict (C)	1	45.000	7.044	0.010
A x B	1	16.200	2.536	0.116
A x C	1	0.200	0.031	0.860
B x C	1	33.800	5.291	0.024
A x B x C	1	9.800	1.534	0.220
Residual	72	6.389		

with $F(1, 72) = 12.271$, $p < 0.0125$. In other words, the interaction involves a reversal of the expected contribution of fictional predictability. (Figure 2 demonstrates the interaction effects.) Although qualified by the interaction effect, the main effects of actual controllability and fictional predictability are also significant, with $F(1, 72) = 5.291$, $p = 0.024$ and $F(1, 72) = 7.044$, $p = 0.010$, respectively. No other main or interaction effects are significant beyond the .05 level. (Table 4 gives the means and standard deviations for each condition.)

Perceived Controllability Over Outcome

Results of the 3-way ANOVA (see Table 6) for perceived controllability over the outcome (question 8 in Appendices B & C) fail to confirm hypothesis 1, since the expected 2-way interaction between time orientation and actual controllability is non-significant. Results also fail to confirm hypothesis 2, since the expected 2-way interaction between actual controllability and fictional predictability is non-significant.

However, the 3-way interaction effect is significant with $F(1, 72) = 6.380$, $p = 0.014$. Tests of significance performed on the simple main effects and the simple interaction effects (Kirk, 1968) show that the magnitude of this dependent measure increases significantly as one proceeds (a) from high to low fictional predictability under future time orientation and high actual controllability, with $F(1, 72) = 8.333$, $p < 0.0125$; (b) across different combinations of time orientation and actual controllability under high fictional predictability, $F(1, 72) = 6.144$, $p < 0.025$; and (c) across different combina-

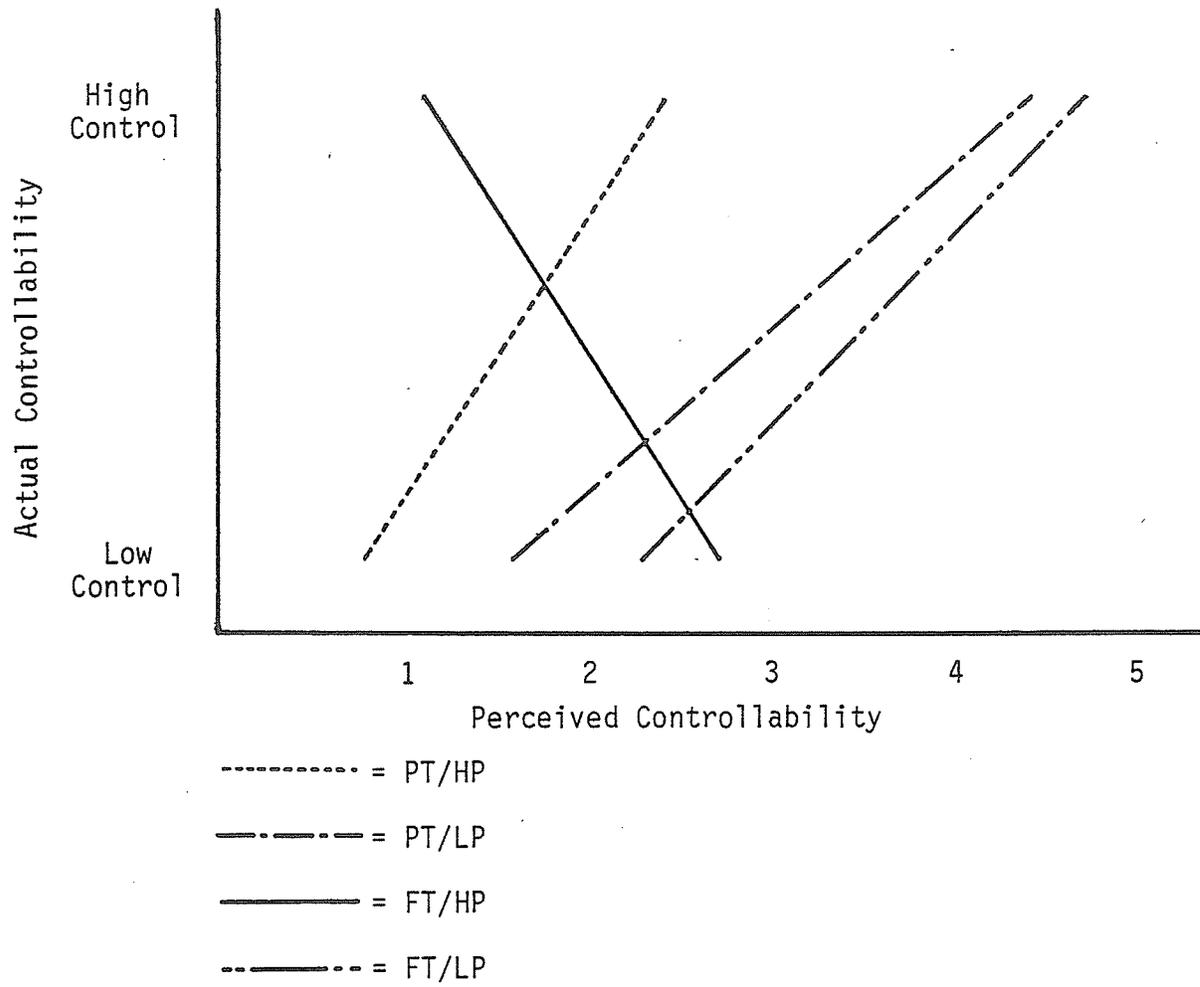


Figure 2. Interaction effect for perceived controllability over disc.

Table 6
Summary of 3-Way ANOVA
for Perceived Controllability Over Outcome

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Time (A)	1	10.512	2.235	0.139
Control (B)	1	7.812	1.661	0.202
Predict (C)	1	13.612	2.894	0.093
A x B	1	4.512	0.959	0.331
A x C	1	2.112	0.449	0.505
B x C	1	3.612	0.768	0.384
A x B x C	1	30.012	6.380	0.014
Residual	72	4.704		

tions of actual controllability and fictional predictability under a future time orientation, $F(1, 72) = 5.788, p \leq 0.025$. (Figure 3 demonstrates the interaction effects.) No other main or interaction effects are significant beyond the .05 level. (Table 4 gives the means and standard deviations for each condition.)

Perceived Predictability Over Symbol

Results of the 3-way ANOVA (see Table 7) for perceived predictability over the symbol (question 2 in Appendices B & C) fail to confirm hypothesis 3, since the expected 2-way interaction between time orientation and fictional predictability is non-significant. Results also fail to confirm hypothesis 4, since the expected 2-way interaction between actual controllability and fictional predictability is non-significant. No main or interaction effects are significant beyond the .05 level. (Table 8 gives the means and standard deviations for each condition.)

Perceived Predictability Over Outcome

Results of the 3-way ANOVA (see Table 9) for perceived predictability over the outcome (question 7 in Appendices B & C) fail to confirm hypothesis 3, since the expected 2-way interaction between time orientation and fictional predictability is non-significant. Results also fail to confirm hypothesis 4, since the expected 2-way interaction between actual controllability and fictional predictability is non-significant.

However, the time main effect is significant with $F(1, 72)$

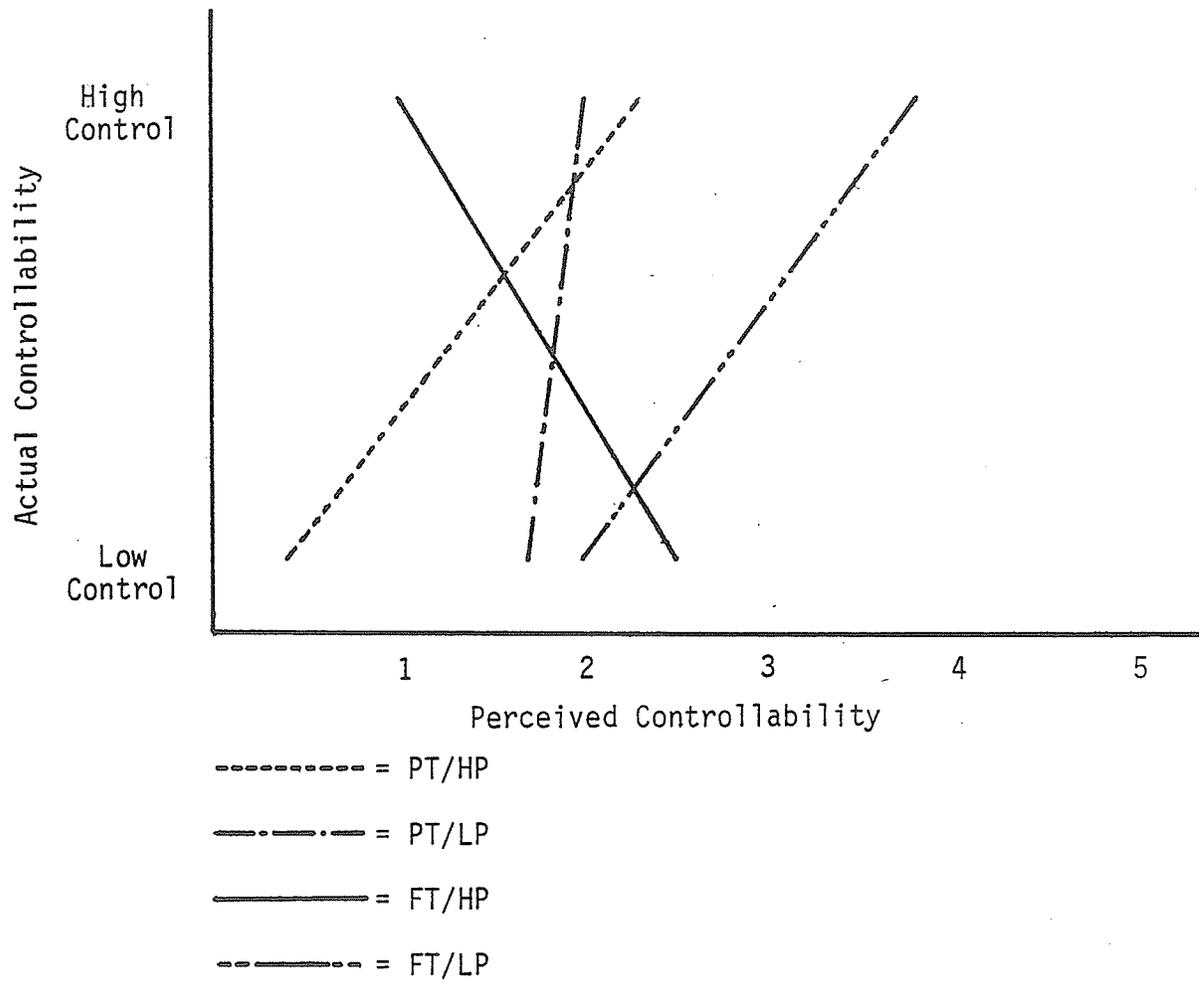


Figure 3. Interaction effect for perceived controllability over outcome.

Table 7
Summary of 3-Way ANOVA
for Perceived Predictability Over Symbol

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Time (A)	1	15.312	3.138	0.081
Control (B)	1	1.012	0.208	0.650
Predict (C)	1	6.612	1.355	0.248
A x B	1	1.012	0.208	0.650
A x C	1	0.612	0.126	0.724
B x C	1	0.612	0.126	0.724
A x B x C	1	5.512	1.130	0.291
Residual	72	4.879		

Table 8
Means and Standard Deviations
for Perceived Predictability

Condition	Over Symbol		Over Outcome	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
1. PT/HC/HP	2.7	2.359	2.8	2.658
2. PT/HC/LP	3.1	2.132	2.2	2.150
3. PT/LC/HP	1.9	2.601	1.6	2.675
4. PT/LC/LP	3.0	1.826	1.9	1.729
5. FT/HC/HP	3.0	2.108	2.6	2.270
6. FT/HC/LP	4.1	1.729	3.6	2.459
7. FT/LC/HP	3.7	2.710	4.0	2.828
8. FT/LC/LP	3.4	2.011	3.3	1.767
Total	3.1	2.199	2.8	2.379

Table 9
 Summary of 3-Way ANOVA
 for Perceived Predictability Over Outcome

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Time (A)	1	31.250	5.662	0.020
Control (B)	1	0.200	0.036	0.850
Predict (C)	1	0.000	0.000	1.000
A x B	1	8.450	1.531	0.220
A x C	1	0.450	0.082	0.776
B x C	1	0.800	0.145	0.705
A x B x C	1	8.450	1.531	0.220
Residual	72	5.519		

= 5.662, $p = 0.020$. Subjects with a future time orientation perceived greater predictability over the outcome than those with a past time orientation. No other main or interaction effects are significant beyond the .05 level. (Table 8 gives the means and standard deviations for each condition.)

Perceived Confidence

Results of the 3-way ANOVA (see Table 10) for perceived confidence (question 10 in Appendices B & C) fail to confirm hypothesis 5, since the expected 2-way interaction between time orientation and actual controllability is non-significant. Results also fail to confirm hypothesis 6, since the expected 2-way interaction between time orientation and fictional predictability is non-significant. Finally, results fail to confirm hypothesis 7, since the expected 2-way interaction between actual controllability and fictional predictability is non-significant. No main or interaction effects are significant beyond the .05 level. (Table 11 gives the means and standard deviations for each condition.)

Perceived Responsibility

Results of the 3-way ANOVA (see Table 12) for perceived responsibility (question 5a in Appendices B & C) fail to confirm hypothesis 8, since the expected 2-way interaction effect between time orientation and actual controllability is non-significant. Results also fail to confirm hypothesis 9, since the expected 2-way interaction between actual controllability and fictional predictability is non-significant.

Table 10
Summary of 3-Way ANOVA
for Perceived Confidence

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Time (A)	1	3.200	1.032	0.313
Control (B)	1	0.800	0.258	0.613
Predict (C)	1	0.000	0.000	1.000
A x B	1	0.050	0.016	0.899
A x C	1	6.050	1.952	0.167
B x C	1	4.050	1.306	0.257
A x B x C	1	0.200	0.065	0.800
Residual	72	3.100		

Table 11
Means and Standard Deviations
for Perceived Confidence

Condition	<u>M</u>	<u>SD</u>
1. PT/HC/HP	4.5	2.173
2. PT/HC/LP	4.8	1.229
3. PT/LC/HP	4.0	2.539
4. PT/LC/LP	3.7	1.160
5. FT/HC/HP	4.0	2.582
6. FT/HC/LP	6.3	1.829
7. FT/LC/HP	3.9	2.424
8. FT/LC/LP	5.3	3.093
Total	4.6	2.277

Table 12
Summary of 3-Way ANOVA
for Perceived Responsibility

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Time (A)	1	5.512	0.780	0.380
Control (B)	1	66.612	9.421	0.003
Predict (C)	1	15.312	2.166	0.145
A x B	1	23.112	3.269	0.075
A x C	1	2.812	0.398	0.530
B x C	1	19.012	2.689	0.105
A x B x C	1	19.012	2.689	0.105
Residual	72	7.071		

However, the controllability main effect is significant with $F(1, 72) = 9.421, p = 0.003$. Subjects with high actual controllability perceived greater responsibility than those with low actual controllability. No other main effects or interactions are significant beyond the .05 level. (Table 13 gives the means and standard deviations for each condition.)

Additional Analyses

Subject Motivation

A one-way ANOVA (see Table 14) was performed on the measure of subjects' wanting to win in the study (question 9 in Appendices B & C). Results indicate that no main or interaction effects are significant beyond the .05 level, and the mean across all conditions is 4.1 on a scale of 0-8. (Table 15 gives the means and standard deviations for each condition.)

Results on the measure of symbol expectancy (question 1 in Appendices B & C) were also analysed (see Table 16). A test of differences between independent proportions indicates that significantly more HP as compared to LP subjects expected the triangle rather than the circle to be on their disc ($z = 2.80, p < 0.005$). It seems that subjects were more apt to forecast that they would get (or had already gotten) the disc with the winning triangle on it when they knew the triangle was the winning criterion. Since subjects were randomly assigned to conditions, such a finding may be an indication that the subjects were interested in winning in the study. In other words, they seem to have shown at least a moderate level of motivation.

Table 13
Means and Standard Deviations
for Perceived Responsibility

Conditions	<u>M</u>	<u>SD</u>
1. PT/HC/HP	3.7	3.302
2. PT/HC/LP	4.2	3.011
3. PT/LC/HP	0.8	1.687
4. PT/LC/LP	1.3	1.418
5. FT/HC/HP	1.8	3.011
6. FT/HC/LP	5.0	2.789
7. FT/LC/HP	3.0	3.055
8. FT/LC/LP	2.3	2.359
Total	2.8	2.892

Table 14
Summary of 3-Way ANOVA
for Wanting to Win

Source of Variation	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Time (A)	1	7.812	1.583	0.212
Control (B)	1	9.112	1.847	0.178
Predict (C)	1	17.112	3.468	0.067
A x B	1	0.312	0.063	0.802
A x C	1	17.112	3.468	0.067
B x C	1	2.812	0.570	0.453
A x B x C	1	0.112	0.023	0.880
Residual	72	4.935		

Table 15
Means and Standard Deviations
for Wanting to Win

Condition	<u>M</u>	<u>SD</u>
1. PT/HC/HP	4.1	1.449
2. PT/HC/LP	3.9	1.197
3. PT/LC/HP	4.2	1.989
4. PT/LC/LP	3.3	1.703
5. FT/HC/HP	3.8	1.549
6. FT/HC/LP	4.9	1.853
7. FT/LC/HP	4.2	2.394
8. FT/LC/LP	4.2	1.687
Total	4.1	1.734

Table 16
 Frequency of Symbol Expectancy
 for High and Low Prediction Subjects

		Symbol Expectancy		
		Triangle	Circle	
Fictional Predictability	HP Subjects	35	5	40
	LP Subjects	24	16	40
		59	21	80

Note. HP subjects knew the triangle was the winning symbol; LP subjects did not.

Interrelationships Among Dependent Measures

Although not incorporated into the hypotheses, it was expected that (a) perceived confidence and responsibility would vary directly with perceived controllability; and (b) perceived confidence would vary directly with perceived predictability. The relationship between perceived controllability and both perceived confidence and perceived responsibility was analysed by means of Pearson product moment correlations. The relationship between perceived predictability and perceived confidence was similarly analysed. (Table 17 gives the intercorrelations among these four dependent measures.)

Table 17
 Summary of Intercorrelations
 Among Dependent Variables

Perceived Controllability			Perceived Responsibility	Perceived Confidence	Perceived Predictability	
Over Symbol a	Over Disc b	Over Outcome c	d	e	Over Symbol f	Over Outcome g
a	.448 (.000)	.746 (.000)	.376 (.001)	.199 (.078)	.595 (.000)	.594 (.000)
b		.520 (.000)	.653 (.000)	.190 (.091)	.293 (.008)	.291 (.009)
c			.498 (.000)	.122 (.280)	.569 (.000)	.598 (.000)
d				-.037 (.746)	.191 (.089)	.225 (.045)
e					.363 (.001)	.397 (.000)
f						.741 (.000)

Note. Each coefficient is based on a Pearson product moment correlation for 80 subjects. Levels of significance are presented in parentheses.

CHAPTER IV

DISCUSSION

Perceived Controllability

The experimenter expected that time orientation and actual controllability would interact to influence the three measures of perceived controllability over the symbol, over the disc, and over the outcome (hypothesis 1); and that actual controllability and fictional predictability would also interact to influence these same three measures of perceived controllability (hypothesis 2). However, neither hypothesis 1 nor 2 was confirmed regardless of the measure of perceived controllability used. Although interactions emerged between the three independent variables for perceived controllability over the symbol and over the outcome, they were more complex than had been stated in the hypotheses. Although a 2-way interaction was obtained between actual controllability and fictional predictability for perceived controllability over the disc, the specific interaction involved an unexpected reversal in the contribution made by fictional predictability.

Perceived Controllability Over Symbol

The major finding concerning perceived controllability over the symbol is the 3-way interaction effect between time orientation, actual controllability, and fictional predictability. The time main effect which also proved to be significant must be qualified by this interaction effect. Since no previous

studies manipulated time, controllability, and predictability, there is no single study with which to compare the obtained 3-way interaction. The experiment of Rothbart and Snyder (1970) is most relevant to the present study for the variable of time orientation; while the research of Wortman (1975) is most relevant for the variables of actual controllability and fictional predictability. The reason that present results are so much more complex than would have been suggested by these previous studies may be due to the combination of the three manipulated independent variables, namely, time orientation, actual controllability, and fictional predictability.

In addition, methodological differences between this and the previous studies might have contributed to the differences in findings. Certain differences between the task used in the present study and that used by Rothbart and Snyder (1970) may have contributed to a difference in subjects' motivation levels in the two studies, and in turn resulted in the non-significance of the interaction between time orientation and actual controllability. The task of dice-throwing used in the previous study may be more ego-involving than the task of selecting one of two discs, especially since subjects in the previous study were also asked to bet on their own choice of "winning outcome." Although both tasks involved risk-taking, while that of the present study did not. The odds of winning on the previous task was 16.7%, while those in the present study was 50%. All this might have

made the previous task more challenging and more motivating than the present one. As indicated by the measures of motivation level, subjects in the present study seemed to have been moderately motivated as their mean across conditions on the measure of "wanting to win" (question 9 of the Questionnaire) was only 4.1 on a 0-8 scale. This moderate level of motivation compared to the high one assumed to have been operating in the previous study may have in turn lowered perceived control in the HC conditions.

Differences in motivation level between subjects in the present study and in Wortman's (1975) study may have similarly contributed to the non-significance of the interaction between actual controllability and fictional predictability. Since all subjects in the Wortman study knew what the possible prizes were, they may have been more eager to obtain a prize, particularly a prize for which they had already expressed a preference. Since the subjects in the present study did not know what the prize would be (let alone whether they would get it), they may have been less motivated to win, so there was less perceived control in the HC/HP conditions.

A factor which might have further contributed to the findings of the present study is the subjects' desire for control and predictability (Burger & Arkin, 1980). A high percentage of those who participated in the present study were foreign students. The different cultural backgrounds of these individuals might have resulted in a different desire for controllability and

predictability than in the previous study. If, for example, these foreign subjects had a relatively lower desire for controllability and predictability -- or at least a lower interest in, or understanding of, the present study because of language problems -- unexpected and more complicated effects on perceived controllability may have resulted.

Other differences in procedure may also have contributed to the differences in findings between the present study and Wortman (1975). In the previous study, the experimenter blindly picked one of the two marbles for the subjects in the LC condition, while in the present study, all subjects obtained their own discs (without the experimenter touching the discs after they had dropped from the can). Thus, perceived control may have been increased for subjects in the LC groups of the present study. However, in the previous study, subjects shook the can themselves to mix the marbles in the HC conditions; while in the present study, the experimenter did so for all conditions, thus possibly resulting in less perceived control for the LC groups. Then, too, in the Wortman study (1975) the outcome (which item the subject obtained) had already been disclosed at the time the dependent measures were taken. It is possible that once knowing the outcome, regardless of what the outcome actually entailed, helped the subjects in the HC/HP condition of the previous study to better rationalize that they had expected and caused the outcome (Fischhoff, 1975; Fischhoff & Beyth, 1975), thereby enhancing the reported feelings of control

under this condition. Wortman (1975) also assigned subjects a five-minute filler task as well as another task (part of the dependent measures) before taking the measure of perceived control; while in the present study, the dependent measures were taken immediately after the experimental manipulations. It is difficult to say how the extra time and/or activities in Wortman's study might have affected the findings, as subjects were asked to recall their feelings over a much longer period of time during which they were engaged in other tasks.

Finally, the experimenter expected the FT/HC/HP group to show exceedingly high perceived controllability over the symbol, but it did not. Evidently, the combination of the three independent variables was sufficient to create a complex interaction effect which could not have been predicted since previous studies failed to vary all three measures.

Perceived Controllability Over Disc

No effect of time orientation is evident on the measure of perceived controllability over the disc. This does not necessarily conflict with the findings of Rothbart and Snyder (1970), however. Just as in the previous study magical thinking (and in turn the effect of time orientation) was possible only by means of wishing for a particular number on the die (but not for a particular die), so in the present study magical thinking was possible only by means of wishing for a particular symbol on a disc (but not for a particular disc), since the discs were indistinguishable under normal light. Besides, the symbol

-- not the disc -- determined the outcome. In other words, time orientation probably had no impact on perceived controllability over the disc because one cannot have a magical effect on the future unless one can distinguish "what one has control of."

Although Burger and Arkin (1980) found that either control or prediction alone could increase one's sense of control, Wortman (1975) found that only when high actual controllability was combined with high fictional predictability was there an increase in perceived controllability. The present study supports the interaction found by Wortman, but the contribution of the prediction variable is strangely reversed. Perhaps when knowing the winning symbol is combined with selecting one's disc (HC/HP condition), there is an additional burden to the subject. It is difficult enough to try to keep a sense of control without knowing how to bring about specific outcomes, but when the subject is expected not only to make an impact on the outcome but also to obtain a predetermined outcome (triangle or circle), this added information may lessen a subject's sense of control, particularly when motivation is not high. Interestingly, although the variable of actual controllability functioned as expected, Wortman's measure of control was closer to control over the symbol in the present study than to control over the disc, for she measured control over the color of the marble rather than control over the marble itself.

Perceived Controllability Over Outcome

The finding of a 3-way interaction effect for controllability over the outcome might again be due to the novel combination of the three variables of time orientation, actual controllability, and fictional predictability. The 2-way interaction between time orientation and actual controllability fails to be significant perhaps for the same reasons as those discussed for the measure of controllability over the symbol. Although no previous study combined the three variables, the investigation by Burger and Arkin (1980) is perhaps most relevant to the present study with regards to the variables of controllability and predictability, since the measure here is most similar to that taken in this previous study. The difference in findings between these two studies might be due to differences in design and methodology.

The Burger and Arkin study (1980) has basically a learned helplessness design. The manipulations of controllability and predictability involved an aversive stimulus (loud noise) and the dependent measure was the performance on a subsequent task. The use of an aversive stimulus might have been the reason why a negative effect was obtained for the LC/LP condition. In addition, Burger and Arkin (1980) manipulated actual rather than fictional predictability. This might well explain the different effects of both the controllability and the predictability manipulations. "Knowing what will happen" (actual predictability) certainly would be expected to yield a higher

level of perceived controllability and predictability than merely "knowing what symbol is associated with what outcome" (fictional predictability).

Perceived Predictability

The experimenter expected that time orientation and fictional predictability would interact to influence the two measures of perceived predictability over the symbol and over the outcome (hypothesis 3); and that actual controllability and fictional predictability would also interact to influence these same two measures of perceived predictability (hypothesis 4). However, neither hypothesis 3 nor 4 was confirmed regardless of the measure of perceived predictability used. A time main effect was significant for perceived predictability over the outcome with the future time orientation groups showing higher perceived predictability over the outcome than the past time orientation groups.

Subjects in the high predictability conditions evidently did not perceive they could predict either the symbol or the outcome. The reason might be based on the fact that subjects were quite realistic in that they were aware the manipulation of predictability over the symbol and over the outcome was fictional. That is, all subjects must have known that they were really unable to foretell which symbol they had (circle or triangle) or which outcome to expect (winning or not winning). The finding of greater perceived predictability over the outcome for subjects in the future conditions may be comparable to Rothbart

and Snyder's (1970) finding that subjects betting on a future outcome took greater risks than those betting on a past outcome. In other words, a future time orientation may facilitate greater perceived predictability or risk-taking than a past time orientation.

Perceived Confidence

The experimenter expected that time orientation and actual controllability would interact to influence the measure of perceived confidence (hypothesis 5); that time orientation and fictional predictability would interact to influence the measure of perceived confidence (hypothesis 6); and that actual controllability and fictional predictability would interact to influence perceived confidence (hypothesis 7). However, none of the three hypotheses were confirmed. Perceived confidence was not affected by time orientation, actual controllability, and/or fictional predictability, but did correlate positively with perceived predictability over both the symbol and the outcome. These findings are in agreement with Strickland et al. (1966) but in direct disagreement with Rothbart and Snyder (1970). Major differences between the task used in the present study and in the study by Rothbart and Snyder (1970) may well explain the differences in findings.

Rothbart and Snyder (1970) used the rolling of a six-sided die. Compared to the task of selecting a disc in the present study, the rolling of a die may be a more ego-involving task, possibly even believed by some subjects to be dependent on skill. In addition, subjects in the previous study were asked

to estimate the outcome of the die, then bet money on their estimate (with one chance in six of winning as opposed to one chance in two for disc selection). All this might have enhanced the sense of challenge, ego-involvement, and motivation for subjects in the previous study, thus better facilitating the use of magical thinking. As suggested by Rothbart and Snyder (1970), magical thinking can be expected to result in greater perceived confidence for FT conditions. These factors might similarly have facilitated perceived controllability and predictability. It is after all in the presence of ego-involvement and adequate motivation that confidence is strengthened.

Similar differences in tasks between Rothbart and Snyder (1970) and Strickland et al. (1966) may have been responsible for similar differences in findings. Strickland's task of throwing two dice and estimating the outcome made for much more complicated and less favorable odds, and possibly a rather discouraging task. That is, as in the present study, Strickland's conditions may not have produced an optimal level of ego-involvement and motivation.

The positive correlation obtained between perceived confidence and perceived predictability is inconclusive as to causality. That is, although the present study expected that perceived predictability would mediate perceived confidence, the significant correlation could also be interpreted as perceived confidence influencing perceived predictability. The present study also expected that perceived controllability would mediate perceived

confidence. However, according to the correlational data, this was not the case. Evidently, while perceived predictability may mediate perceived confidence, perceived controllability does not.

Perceived Responsibility

The experimenter expected that time orientation and actual controllability would interact to influence perceived responsibility (hypothesis 8); and that actual controllability and fictional predictability would also interact to influence perceived responsibility (hypothesis 9). However, neither hypothesis was confirmed. Results reveal the presence of a control main effect. In addition, positive correlations were obtained between perceived responsibility on the one hand and the three measures of perceived controllability on the other. Present findings agree with those of Lerner and Matthews (1967) but fail to confirm the hypothesized time/control interaction based partly on Rothbart and Snyder (1970). The present findings also fail to agree with those of Wortman (1975), possibly due to methodological differences.

The lack of a contribution by time towards influencing perceived responsibility might, again, be due to the possibility that the task used did not sufficiently facilitate magical thinking so perceived controllability and ultimately perceived responsibility would thereby be produced. The differences in findings as compared to Wortman (1975) are likely attributable to major differences between the specific measures of perceived

responsibility taken in the two studies. The present study measured perceived responsibility over the disc obtained, while Wortman measured perceived responsibility over the outcome (the consumer item) obtained. Since, as previously mentioned, predictability was not applicable to the disc itself in the present study (while it was applicable to the outcome in Wortman's study), the failure of this measure to reveal any effect of fictional predictability may be understandable.

The correlation between perceived responsibility and perceived controllability is inconclusive in terms of causality. However, it should be noted that this correlation is in agreement with the expected relationship that perceived controllability mediates perceived responsibility. Nevertheless, it should also be noted that it does not conflict with Wortman's opposing belief that responsibility (as well as choice) mediates perceived control.

Conclusion and Implications for Future Research

From the comparison of present results with those obtained by previous researchers, it may appear as if the present study resulted in far more findings which disagree rather than agree with previous findings of related studies. Interestingly, however, comparisons between the results of previous findings and those of only the comparable conditions in the present study indicate the contrary. Out of nine findings from earlier studies, present findings were clearly consistent with three of them, and were consistent with three more, but the mean differences involved were not statistically significant. In other words, if one

compares only those conditions in the present study most comparable to those in previous studies, present results are, in general, not all that different.

Several suggestions can be made for future researchers on the topics of time orientation, control, and prediction.

For future studies, motivators should be incorporated into the experimental situation such that subjects will invest a high level of interest in the experiment. A measure of this motivation level should also be taken.

Where self-rated dependent measures include both perceived controllability and perceived predictability and/or more than one measure of each of these variables, an attempt should be made to counterbalance the order in which the dependent measures are taken. The present study obtained many more findings for measures of perceived controllability than for those of perceived predictability. Since the measures of perceived predictability consistently appeared before those of perceived controllability for all subjects, it cannot be ruled out that this in itself did not contribute to the findings. If controllability and predictability are rated differently depending on which context is established first, future studies should take account of this possibility in their research design.

Where circumstances allow, it is recommended that future researchers limit their subjects to include only individuals of the same cultural background and/or first language. Foreign subjects who have not completely mastered the English language

may have difficulty supplying accurate self-ratings. Also, it is possible that cultural differences contribute to differences in the desire for controllability and predictability. Admittedly, individuals from different cultures are bound to have other differences between them, any one of which may contaminate results of a research study.

The present findings hold many other general implications for future research. The unexpected finding of 3-way interaction effects for two of the measures of perceived controllability is a worthy contribution to the existent literature. It points to the possibility that the relationship between prediction and control is far more complex than many researchers in the area have expected, or have had reason to expect. Future research is needed to investigate further the complex interaction of the three variables. Perhaps actual predictability (rather than merely fictional predictability) should also be investigated.

The inconsistent findings among studies in the area of time orientation may be due to differences in the levels of controllability and predictability available to subjects from study to study. Likewise, the inconsistent findings among studies in the area of prediction and control may be due to differences in time orientations.

Broader Implications

The interaction between time orientation and the various combinations of actual versus fictional controllability/predictability opens new possibilities for inducing and/or in-

creasing perceived control by manipulating time orientation where the combination of time/controllability/predictability is not optimal for perceived control. This might be of some practical import in, for example, psychotherapy for individuals whose problems include a low level of perceived control due to real life circumstances. That is, by helping to orient a patient towards the future, a therapist may facilitate a health-producing sense of patient control even when actual controllability and predictability cannot be immediately changed. In addition, Bavelas (1973) has found that time orientation can influence a person's description of the same event. Present findings agree with Bavelas (1973) in suggesting that different temporal contexts of the same content of psychological test items may elicit entirely different responses from the same person. For example, the question "Would you be anxious in a crowded room?" versus "Have you been anxious in a crowded room?" may not be answered the same way by the same individual.

The finding that we tend to perceive future outcomes as more predictable than past outcomes, even where no actual predictability is possible, suggests that we hold a somewhat fatalistic view of the past (Fischhoff, 1975). Or perhaps it is our perception of the future that tends to be distorted, since we apparently perceive more predictability over a future outcome merely because it has not yet happened. Being out of contact with reality can occur in either direction, that is, by thinking one has less predictability for an undisclosed past event than

the evidence warrants or by thinking one has more predictability for a future event than the evidence warrants.

The finding that behavioral control even in a chance situation can increase not only perceived control but perceived responsibility as well holds certain practical implications. This finding seems to suggest that behavioral control over insignificant life events when accompanied by a lack of control over major life events can produce some measure of perceived control. This is a significant finding for the disadvantaged in our society who often suffer from a lack of perceived control due to lack of ultimate control over their lives. Behavioral control over small aspects of their lives can be made available to them in order to induce perceived control. In the long run, this might ultimately (e.g., through choosing to vote in a democratic society) lead to a change in these individuals' environmental constraints.

Finally, the correlational data suggest that people seem to associate perceived controllability with perceived responsibility and perceived predictability with perceived confidence. Therefore, one's sense of responsibility may be facilitated by increasing one's perceived controllability but not one's perceived predictability. Similarly, one's sense of confidence may be facilitated by increasing one's perceived predictability but not one's perceived controllability. Whether in areas of child-raising or group leadership, the roads to responsibility and confidence may be quite different from one another.

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Appendix A

Instructions for Each Experimental Condition

Condition 1

I have here two wooden discs on which markings have been made using an invisible ink which can be made visible under the ultraviolet light of this lamp. [E turns on lamp.] Notice that one of these discs is marked with a triangle and the other with a circle. [E turns off lamp and puts it onto T.V. table. Then E puts discs inside coffee can and shows S the inside of the can.]

Now, the discs are going to be shaken vigorously inside this can, then blindly dropped one at a time onto the table. Please pick one of the discs and hold it in your hand. [Shake can and drop discs out.] Now, please pick one of the discs and hold it in your hand.

Now I'm going to give you the instructions for the experiment. Please follow along with this. [Hand S copy of instructions.]

The purpose of this study is to investigate the psychological characteristics of winners and losers before they actually learn whether they have become winners or losers. In this experiment, all subjects are given one opportunity to win a prize. As you have seen, one of the two discs is marked with a circle and the other with a triangle.

The discs have been shaken vigorously inside the can, then blindly dropped one at a time onto the table. You have already been asked to pick one of the discs. In order for you to be the winner of a prize, the symbol on the disc you picked must be the symbol written in invisible ink on this card. [E indicates card to S then places it under ultraviolet lamp. E turns on ultraviolet lamp and shows S the card.] Notice that the symbol on the card is a triangle. At the end of the experiment, the symbol on the disc you picked will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box.

Now please fill out this questionnaire.

Condition 2

I have here two wooden discs on which markings have been made using an invisible ink which can be made visible under the ultraviolet light of this lamp. [E turns on lamp.] Notice that one of these discs is marked with a triangle and the other with a circle. [E turns off lamp and puts it onto T.V. table. Then E puts discs inside coffee can and shows S the inside of the can.]

Now, the discs are going to be shaken vigorously inside this can, then blindly dropped one at a time onto the table. Please pick one of the discs and hold it in your hand. [Shake can and drop discs out.] Now, please pick one of the discs and hold it in your hand.

Now I'm going to give you the instructions for the experiment. Please follow along with this. [Hand S copy of instructions.]

The purpose of this study is to investigate the psychological characteristics of winners and losers before they actually learn whether they have become winners or losers. In this experiment, all subjects are given one opportunity to win a prize. As you have seen, one of the two discs is marked with a circle and the other with a triangle.

The discs have been shaken vigorously inside the can, then blindly dropped one at a time onto the table. You have already been asked to pick one of the discs. In order for you to be the winner of a prize, the symbol on the disc you picked must be the symbol written in invisible ink on this card. [E indicates card to S then places it under ultraviolet lamp.] The symbol on this card will not be shown to you until the end of the experiment. At the end of the experiment, the symbol on the disc you picked will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box.

Now please fill out this questionnaire.

Condition 3

I have here two wooden discs on which markings have been made using an invisible ink which can be made visible under the ultraviolet light of this lamp. [E turns on lamp.] Notice that one of these discs is marked with a triangle and the other with a circle. [E turns off lamp and puts it onto T.V. table. Then E puts discs inside coffee can and shows S the inside of the can.]

Now, the discs are going to be shaken vigorously inside this can, then blindly dropped one at a time onto the table. Please take the first disc that comes out of the can and hold it in your hand. [Shake can and drop discs out.] Now, please take the first disc that dropped out of the can and hold it in your hand.

Now I'm going to give you the instructions for the experiment. Please follow along with this. [Hand S copy of instructions.]

The purpose of this study is to investigate the psychological characteristics of winners and losers before they actually learn whether they have become winners or losers. In this experiment, all subjects are given one opportunity to win a prize. As you have seen, one of the two discs is marked with a circle and the other with a triangle.

The discs have been shaken vigorously inside the can, then blindly dropped one at a time onto the table. You have already been asked to take the first disc that dropped out of the can. In order for you to be the winner of a prize, the symbol on the disc given you must be the symbol written in invisible ink on this card. [E indicates card to S then places it under ultraviolet lamp. E turns on ultraviolet lamp and shows S the card.] Notice that the symbol on the card is a triangle. At the end of the experiment, the symbol on the disc given you will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box.

Now please fill out this questionnaire.

Condition 4

I have here two wooden discs on which markings have been made using an invisible ink which can be made visible under the ultraviolet light of this lamp. [E turns on lamp.] Notice that one of these discs is marked with a triangle and the other with a circle. [E turns off lamp and puts it onto T.V. table. Then E puts discs inside coffee can and shows S the inside of the can.]

Now, the discs are going to be shaken vigorously inside this can, then blindly dropped one at a time onto the table. Please take the first disc that comes out of the can and hold it in your hand. [Shake can and drop discs out.] Now, please take the first disc that dropped out of the can and hold it in your hand.

Now I'm going to give you the instructions for the experiment. Please follow along with this. [Hand S copy of instructions.]

The purpose of this study is to investigate the psychological characteristics of winners and losers before they actually learn whether they have become winners or losers. In this experiment, all subjects are given one opportunity to win a prize. As you have seen, one of the two discs is marked with a circle and the other with a triangle.

The discs have been shaken vigorously inside the can, then blindly dropped one at a time onto the table. You have already been asked to take the first disc that dropped out of the can. In order for you to be the winner of a prize, the symbol on the disc given you must be the symbol written in invisible ink on this card. [E indicates card to S then places it under ultraviolet lamp.] The symbol on this card will not be shown to you until the end of the experiment. At the end of the experiment, the symbol on the disc given you will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box.

Now please fill out the questionnaire.

Condition 5

I have here two wooden discs on which markings have been made using an invisible ink which can be made visible under the ultraviolet light of this lamp. [E turns on lamp.] Notice that one of these discs is marked with a triangle and the other with a circle. [E turns off lamp and puts it onto T.V. table. Then E puts discs inside coffee can and shows S the inside of the can.]

Now I'm going to give you the instructions for the experiment. Please follow along with this. [Hand S copy of instructions.]

The purpose of this study is to investigate the psychological characteristics of winners and losers before they actually learn whether they have become winners or losers. In this experiment, all subjects are given one opportunity to win a prize. As you have seen, one of the two discs is marked with a circle and the other with a triangle.

The discs will be shaken vigorously inside the can, then blindly dropped one at a time onto the table. You will be asked to pick one of the discs and hold it in your hand. In order for you to be the winner of a prize, the symbol on the disc you pick must be the symbol written in invisible ink on this card. [E indicates card to S then places it under ultraviolet lamp. E turns on ultraviolet lamp and shows S the card.] Notice that the symbol on the card is a triangle. At the end of the experiment, the symbol on the disc you pick will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box.

Now please fill out this questionnaire.

Now, the discs are going to be shaken vigorously inside this can, then blindly dropped one at a time onto the table. Please pick one of the discs and hold it in your hand. [Shake can and drop discs out.] Now, please pick one of the discs and hold it in your hand.

Condition 6

I have here two wooden discs on which markings have been made using an invisible ink which can be made visible under the ultraviolet light of this lamp. [E turns on lamp.] Notice that one of these discs is marked with a triangle and the other with a circle. [E turns off lamp and puts it onto T.V. table. Then E puts discs inside coffee can and shows S the inside of the can.]

Now I'm going to give you the instructions for the experiment. Please follow along with this. [Hand S copy of instructions.]

The purpose of this study is to investigate the psychological characteristics of winners and losers before they actually learn whether they have become winners or losers. In this experiment, all subjects are given one opportunity to win a prize. As you have seen, one of the two discs is marked with a circle and the other with a triangle.

The discs will be shaken vigorously inside the can, then blindly dropped one at a time onto the table. You will be asked to pick one of the discs and hold it in your hand. In order for you to be the winner of a prize, the symbol on the disc you pick must be the symbol written in invisible ink on this card. [E indicates card to S then places it under ultraviolet lamp.] The symbol on this card will not be shown to you until the end of the experiment. At the end of the experiment, the symbol on the disc you pick will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box.

Now please fill out this questionnaire.

Now, the discs are going to be shaken vigorously inside this can, then blindly dropped one at a time onto the table. Please pick one of the discs and hold it in your hand. [Shake can and drop discs out.] Now, please pick one of the discs and hold it in your hand.

Condition 7

I have here two wooden discs on which markings have been made using an invisible ink which can be made visible under the ultraviolet light of this lamp. [E turns on lamp.] Notice that one of these discs is marked with a triangle and the other with a circle. [E turns off lamp and puts it onto T.V. table. Then E puts discs inside coffee can and shows S the inside of the can.]

Now I'm going to give you the instructions for the experiment. Please follow along with this. [Hand S copy of instructions.]

The purpose of this study is to investigate the psychological characteristics of winners and losers before they actually learn whether they have become winners or losers. In this experiment, all subjects are given one opportunity to win a prize. As you have seen, one of the discs is marked with a circle and the other with a triangle.

The discs will be shaken vigorously inside the can, then blindly dropped one at a time onto the table. You will be asked to take the first disc that drops out of the can and hold it in your hand. In order for you to be the winner of a prize, the symbol on the disc given you must be the symbol written in invisible ink on this card. [E indicates card to S then places it under ultraviolet lamp. E turns on lamp and shows S the card.] Notice that the symbol on the card is a triangle. At the end of the experiment, the symbol on the disc given you will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box.

Now please fill out this questionnaire.

Now, the discs are going to be shaken vigorously inside this can, then blindly dropped one at a time onto the table. Please take the first disc that drops out of the can and hold it in your hand. [Shake can and drop discs out.] Now, please take the first disc that dropped out of the can and hold it in your hand.

Condition 8

I have here two wooden discs on which markings have been made using an invisible ink which can be made visible under the ultraviolet light of this lamp. [E turns on lamp.] Notice that one of these discs is marked with a triangle and the other with a circle. [E turns off lamp and puts it onto T.V. table. Then E puts discs inside coffee can and shows S the inside of the can.]

Now I'm going to give you the instructions for the experiment. Please follow along with this. [Hand S copy of instructions.]

The purpose of this study is to investigate the psychological characteristics of winners and losers before they actually learn whether they have become winners or losers. In this experiment, all subjects are given one opportunity to win a prize. As you have seen, one of the discs is marked with a circle and the other with a triangle.

The discs will be shaken vigorously inside the can, then blindly dropped one at a time onto the table. You will be asked to take the first disc that drops out of the can and hold it in your hand. In order for you to be the winner of a prize, the symbol on the disc given you must be the symbol written in invisible ink on this card. [E indicates card to S then places it under ultraviolet lamp.] The symbol on this card will not be shown to you until the end of the experiment. At the end of the experiment, the symbol on the disc given you will be disclosed under the ultraviolet lamp to see whether you will win a prize from that box.

Now please fill out this questionnaire.

Now, the discs are going to be shaken vigorously inside this can, then blindly dropped one at a time onto the table. Please take the first disc that drops out of the can and hold it in your hand. [Shake can and drop discs out.] Now, please take the first disc that dropped out of the can and hold it in your hand.

Appendix B

Past Time Orientation Questionnaire

Please circle the MOST appropriate answer for each question below.

1. Which SYMBOL do you expect to find on the DISC you obtained? (Give one BEST estimate.)

△ ○

2. To what extent do you feel you know which SYMBOL is on the disc you obtained?

not at all 0 1 2 3 4 5 6 7 8 to a great extent

3. To what extent do you feel you have influenced which SYMBOL you obtained?

not at all 0 1 2 3 4 5 6 7 8 to a great extent

4. To what extent do you feel you have influenced which DISC you obtained?

not at all 0 1 2 3 4 5 6 7 8 to a great extent

5. To what extent do you feel each of the following factors is responsible for your obtaining the DISC you have?

a. You yourself

not at all 0 1 2 3 4 5 6 7 8 to a great extent

b. The experimenter

not at all 0 1 2 3 4 5 6 7 8 to a great extent

c. Chance

not at all 0 1 2 3 4 5 6 7 8 to a great extent

6. a. Has the experimenter already told you which SYMBOL is associated with which OUTCOME? (OUTCOME = winning or not winning a prize.)

YES

NO

b. If YES, which of the following were you told?

i. If ○, I win a prize; if △, I do not win a prize.

ii. If △, I win a prize; if ○, I do not win a prize.

7. To what extent do you feel you know which OUTCOME will occur? (OUTCOME = winning or not winning a prize.)

not at all 0 1 2 3 4 5 6 7 8 to a great extent

8. To what extent do you feel you have influenced which OUTCOME will occur? (OUTCOME = winning or not winning a prize.)

not at all 0 1 2 3 4 5 6 7 8 to a great extent

9. To what extent do you want to win a prize in this study?

not at all 0 1 2 3 4 5 6 7 8 to a great extent

10. How confident are you that you will win a prize in this study?

not at all 0 1 2 3 4 5 6 7 8 to a great extent

Appendix C

Future Time Orientation Questionnaire

Please circle the MOST appropriate answer for each question below.

1. Which SYMBOL do you expect to find on the DISC you will obtain? (Give one BEST estimate.)

\triangle \circ

2. To what extent do you feel you know which SYMBOL will be on the disc you obtain?

not at all 0 1 2 3 4 5 6 7 8 to a great extent

3. To what extent do you feel you will have influenced which SYMBOL you obtain?

not at all 0 1 2 3 4 5 6 7 8 to a great extent

4. To what extent do you feel you will have influenced which DISC you obtain?

not at all 0 1 2 3 4 5 6 7 8 to a great extent

5. To what extent do you feel each of the following factors will be responsible for your obtaining the DISC you will have?

a. You yourself

not at all 0 1 2 3 4 5 6 7 8 to a great extent

b. The experimenter

not at all 0 1 2 3 4 5 6 7 8 to a great extent

c. Chance

not at all 0 1 2 3 4 5 6 7 8 to a great extent

6. a. Has the experimenter already told you which SYMBOL is associated with which OUTCOME? (OUTCOME = winning or not winning a prize.)

YES

NO

b. If YES, which of the following were you told?

i. If \circ , I win a prize; if \triangle , I do not win a prize.

ii. If \triangle , I win a prize; if \circ , I do not win a prize.

7. To what extent do you feel you know which OUTCOME will occur? (OUTCOME = winning or not winning a prize.)

not at all 0 1 2 3 4 5 6 7 8 to a great extent

8. To what extent do you feel you will have influenced which OUTCOME will occur? (OUTCOME = winning or not winning a prize.)

not at all 0 1 2 3 4 5 6 7 8 to a great extent

9. To what extent do you want to win a prize in this study?

not at all 0 1 2 3 4 5 6 7 8 to a great extent

10. How confident are you that you will win a prize in this study?

not at all 0 1 2 3 4 5 6 7 8 to a great extent