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The Illusion of Control

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A series of studies was conducted to elucidate a phenomenon here referred to as the "illusion of control." An illusion of control was defined as an expectancy of a personal success probability inappropriately higher than the objective probability would warrant. It was predicted that factors from skill situations (competition, choice, familiarity, involvement) introduced into chance situations cause individuals to feel inappropriately confident. In Study 1 subjects cut cards against either a confident or a nervous competitor; in Study 2 lottery participants were or were not given a choice of ticket; in Study 3 lottery participants were or were not given a choice of either familiar or unfamiliar lottery tickets; in Study 4, in a novel chance game, subjects either had or did not have practice and responded either themselves or by proxy; in Study 5 lottery participants at a racetrack were asked their confidence at different times; finally, in Study 6 lottery participants either received a single three-digit ticket or one digit on each of 3 days. Indicators of confidence in all six studies supported the prediction.

While most people will agree that there is much overlap between skill and luck, a full understanding of how inextricably bound the two are has yet to be attained. In principle the distinction seems clear. In skill situations there is a causal link between behavior and outcome. Thus, success in skill tasks is controllable. Luck, on the other hand, is a fortuitous happening. Success in luck or chance activities is apparently uncontrollable. The issue of present concern is whether or not this distinction is generally recognized. The position taken here is that it is not. While people may pay lip service to the concept of chance, they behave as though chance events are subject to control. If this is correct, it is of interest to determine the variables responsible for this confusion.

A number of different lines of research provide support for the position that people assume a skill orientation in chance situations. Studies concerned with the judgment of contingency, the "just world hypothesis," or the attribution of responsibility for an outcome all demonstrate either that people deny the operation of chance or when they do appeal to chance as an explanation for an event, this appeal is not simply a function of an objective lack of contingency. A brief look at some of this literature helps to clarify this point.

In several laboratory studies, investigators have shown that adults often perceive causal relationships in the absence of contingency. Ward and Jenkins (1965) asked three groups of subjects to judge, from a set of facts presented in one of three ways, the amount of control exerted by cloud seeding over rainfall. The information "seed" or "no seed" followed by "rain" or "no rain" was presented serially to one group of subjects, in an organized numerical summary to a second group, and serially followed by an organized summary to the third group. Although the event, cloud seeding, was chosen in order to suggest the operation of chance, the only group that successfully judged the lack of contingency was the second group, which received the information only in the summary form. When the information was presented over time, as is usually the case in real life, subjects judged contingency when there was none. One might

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argue that the reported inference of contingency was a response to the demand characteristics in the situation rather than a true reflection of what subjects actually believed. However, in a conceptually similar study on psychodiagnosis, Chapman and Chapman (1967) also found that subjects expecting to see a relationship overlooked disconfirming evidence even when offered a $20 prize for being accurate.

These and other researchers (e.g., Bruner & Revusky, 1961; Golding & Rorer, 1971; Smedslund, 1963; Starr & Katkin, 1969; Hamilton & Gifford, Note 1) have provided clear evidence that there are many situations in which people fail to accurately judge the lack of contingency. An interesting variant of this occurs in what has been called the "just world" hypothesis.

A belief in a just world is a belief that actions and outcomes must have the same valence. That is, good things happen to people who do good things, and bad things happen to people who do bad things. The belief that everyone gets what he deserves denies the operation of chance. It eliminates the necessity for concern and worry over the possibility that aversive events may occur by chance at any time. Events become predictable and thus, by being anticipated, are often controllable.

In one of the first of these studies testing the just world hypothesis, Lerner (1965b) asked subjects to evaluate two workers, one of whom was fortuitously rewarded. In order to make sense of this chance event, subjects perceived the worker who was rewarded as more capable. In a study by Lerner and Simmons (1966), subjects witnessed a peer apparently receive severe shocks for making minor errors in a learning task. They found that subjects reject and devalue a suffering victim to make the negative consequences seem deserved when they are unable to alter the victim's fate. Landy and Aronson (1969), Lerner and Mathews (1967), Rubin and Peplau (1973), Shaw and Skolnick (1971), Simmons and Piliavin (1972), and Walster (1966) have also found support for the just world hypothesis. One expects good people to do good things, and one expects good things to happen to good people. As Lee (1971) said of a poker player in a discussion of luck, "If our hero did not win our estimation of him would decrease even though objectively we have to realize that getting four kings had nothing to do with any of his qualities" (p. 66).

Whether or not an event will be perceived as determined by skill or chance may depend on factors relatively independent of the actual contingency. Cohen (1964); Feather (1969); Kelley (1967); Langer and Roth (in press); Streufert and Streufert (1969); Weiner, Frieze, Kukla, Reed, Rest, and Rosenbaum (1971); and Wortman, Costanzo, and Witt (1973), for example, have all discussed the tendency for people to attribute desirable outcomes to internal factors but to blame external factors such as luck for failures. The valence of the outcome would not be a potent factor if people distinguished between chance and skill on the basis of the objective contingency.

Some observational support for the assertion that people treat chance events as controllable comes from sociologists Goffman (1967) and Henslin (1967). While studying gambling practices in Las Vegas, Goffman noted that dealers who experienced runs of bad luck ran the risk of losing their jobs. Henslin studied dice playing and noted that dice players clearly behave as if they were controlling the outcome of the toss. They are careful to throw the dice softly if they want low numbers or to throw hard for high numbers. They believe that effort and concentration will pay off. Control can also be exerted when betting; for example, always bet with the person who looks like he has the most control. These behaviors are all quite rational if one believes that the game is a game of skill.

If one were going to try to exert control over a chance event, one would exert influence before the outcome of the event was determined. Strickland, Lewicki, and Katz (1966) tested this notion. Subjects were involved in a dice-throwing game in which they selected from a number of alternative wagers either before the dice were tossed or just after the toss but before the outcome was

disclosed. They found that subjects took greater risks, that is, placed larger bets, when betting before rather than after the toss.

The previous research shows that people often fail to respond differentially to controllable and uncontrollable events. However, the factors that govern this illusory control behavior have not been studied systematically. One way to identify these factors is to explore characteristics of skill situations. In skill situations people engage in various overt and covert behaviors designed to maximize the probability of success: choosing which materials are appropriate for the situation and which responses to make, familiarizing oneself with these materials and responses, spending some time thinking about the task to arrive at possible strategies that may be employed, and exerting effort while actively engaged in the task to increase the chance of success. In addition, skill situations have certain characteristics not necessarily instigated by the individual in order to maximize the likelihood of success. Competition is one such factor.

These skill-related factors may be responsible for inducing an illusion of control. An illusion of control is defined as an expectancy of a personal success probability inappropriately higher than the objective probability would warrant. The following studies were designed to assess the effectiveness of these skill-related factors in occasioning an illusion of control. Specifically, the research to be described was designed to test the following hypothesis: By encouraging or allowing participants in a chance event to engage in behaviors that they would engage in were they participating in a skill event, one increases the likelihood of inducing a skill orientation; that is, one induces an illusion of control. Thus, one should be able to introduce any of the previously mentioned aspects of a skill situation—*choice, stimulus* or *response familiarity, passive* or *active involvement, competition*—into a chance situation where the participants no longer influence the outcome and occasion behavior more appropriate to a skill event.

A strong test of this hypothesis is the introduction of these factors into situations such as lotteries, where the outcomes are completely chance determined. If these factors are successful in inducing an illusion of control in these mechanical situations, then the effects should be far greater when they are introduced into situations where there is already an element of control.

The following studies were conducted with people of different ages, of different socioeconomic status, and of both sexes and, in all but one instance, took place in real-world settings. The first study investigated competition. Subjects were engaged in a completely chance-determined card game where they drew for high card against a confederate who was either confident or nervous. In the second study participants in a lottery were either given or not given their choice of lottery ticket. In the third study lottery participants again were given either choice or no choice, and in addition, stimulus familiarity was varied by using familiar or unfamiliar lottery tickets. The fourth study used a piece of equipment that enabled the play of a chance game. Participants were either given or not given the opportunity to familiarize themselves with the response that was to be made. In addition, they were either to tell the experimenter which response to make or to be more actively involved by making the response themselves. The fifth study tested the effects of passive involvement by asking participants in a lottery at Yonkers Raceway at three different points in time before the drawing how confident they were that they would win the lottery. In the sixth study a lottery was conducted to assess again the effects of passive involvement. Participants either received a three-digit numbered lottery ticket on the day of purchase or received part of their ticket, one digit, on three successive days so that they had to think about the lottery on at least three separate occasions.

EXPERIMENT 1: EFFECTS OF COMPETITION ON THE ILLUSION OF CONTROL

Since people often engage in competition when they are assessing their skills, it is hypothesized that the introduction of this skill-related factor into a chance setting

induces an illusion of controllability. The amount of control one actually has in producing a successful outcome in skilled competition varies as a function of the ability of one's opponent. If people respond to chance events in which there is competition as if these events were skill determined, then the illusion of control should also vary as a function of characteristics of one's opponent.

In the following study subjects compete in a chance task against either an attractive, confident confederate or an awkward and nervous confederate. If the task is responded to as if the outcome is uncontrollable, then factors other than the likelihood of winning play a larger role in influencing subjects' bets. Under these circumstances, subjects are likely to bet a lot when competing against the confident confederate either because the confederate is expected to bet a lot and subjects want to appear similar to him or because risk is a value in our society (Wallach & Wing, 1968). Subjects may also bet a lot when playing against the awkward confederate in order to appear different from him or, again, because risk is a value. However, they may also bet less when betting against the awkward confederate because he is expected to bet less, so subjects can take less risk and still appear to be risky. In either case, subjects should not bet more against the awkward confederate than against the confident confederate. On the other hand, if, as predicted, competition induces a skill orientation, then subjects will bet on the basis of the likelihood of winning. Since the less competent one's opponent is, the more likely one is to win, subjects should wager more when competing against the awkward confederate than when competing against the confident confederate.

Method

Subjects

Subjects were 36 male undergraduates enrolled in the introductory psychology course at Yale University. They were recruited by an advertisement that offered course credit and a chance to win money for participation in a study on the relationship between cognitive and physiological responses. They were randomly assigned to one of two experimental conditions, with 18 subjects in each.

Procedure

When each subject entered the room in which the experiment was to take place, he found waiting a confederate posing as another subject. The confederate, a male undergraduate blind to the experimental hypothesis, played the role of either a confident or an unconfident person (dapper or schnook condition).

Dapper condition. In this condition the confederate appeared confident and outgoing and was dressed in a well-fitting sports coat. He introduced himself to the subject and pointed out a sign posted in the room. The sign said that the experimenter would be right back and asked subjects to fill out a brief questionnaire while waiting. To make the study appear to be concerned with physiological matters, the questionnaire asked about diet, family diseases, and the like. The subject and the confederate completed the form and interacted during this time for approximately 10 minutes. The conversation was unstructured but focused mainly on sports events. After this interaction the confederate nonchalantly knocked on the wall that separated himself and the subject from the experimenter to signal her to return to the room.

Schnook condition. In this condition the confederate appeared rather shy, behaved awkwardly, had a nervous twitch, and was dressed in a sports coat that was too small for him. In all other respects this condition was identical to the dapper condition.

In both conditions the confederate removed his coat before the experimenter entered the room. After she apologized for being late, the experimenter instructed the subjects to sit down and not talk while she prepared the materials for the study. By employing these measures, it was possible to keep the experimenter blind to the preceding experimental manipulation. The subject and the confederate sat at a table facing each other. After the experimenter placed a televolter, alcohol, gauze sponges, electrodes, electrode gel, and tape on the table, she recited the following instructions:

> We're interested in the effects of certain motoric and cognitive responses on physiological responses. Specifically, we're interested in changes in skin resistance as a function of pressured and nonpressured tasks. The study was designed so that, hopefully, you will enjoy the tasks while I get the information I need. You'll have the chance to either win or lose money so it should be fun—but there's no guarantee that you'll walk out of here with any extra money. Okay, now the first thing I want you to do is tape these electrodes to your hands. I want to put it on the hand that you don't write with. Are you right or left handed? Don't worry, none of this will hurt. [The experimenter tapes electrodes, plugs in the televolter, and brings out a deck of playing cards.]
>
> The first task is a card game. The rules are that you'll each choose a card from the deck, and whoever selects the higher card wins that round. There will be four rounds, and before each you'll write down how much you want to bet. You can

wager anywhere from 0 to 25¢ on each round. You'll then show your bets to me but not to each other. Don't look at the card you choose. This way your bets and the outcomes won't influence your physiological responses on the next task. I'll turn the cards over for you and figure out how much was won or lost later with each of you individually. The betting is just between each of you and myself, so if you win I'll pay you and if you lose you'll pay me either in money or subject time. Are you willing to participate? [Confederate quickly answers, "Sure."] Good, now we can begin. Don't write down your bet until I say ready so that I can get a baseline reading.

The experimenter then instructed subjects to record their bets and show them to her. The bets were recorded, and then subjects alternately drew a card and, on request, simultaneously showed them to the experimenter, who recorded the outcome and then placed the cards faced down on a nearby table. Before each step the experimenter appeared to be recording skin resistance fluctuations. This procedure was repeated for four trials.

Dependent Measure and Manipulation Check

The dependent measure was the amount of money subjects wagered on each round.

After the card game was over, subjects were told that the next task would be run individually, so that one of the subjects would have to go to another room where another experimenter would give him instructions. They were also told that once this experiment was over, this experimenter would tell the other experimenter the outcome of the card game so that the debts could be settled. The experimenter asked the confederate to leave and told him and the subject to say goodbye to each other, since their joint participation was over. Each subject was then given an interpolated task so that he won approximately $2 regardless of his previous bets. The subject examined a jar of jelly beans and estimated the number present while the experimenter recorded skin resistance fluctuations. Then the subject was given another questionnaire that was physiological in nature. After he was asked whether he thought the other subject's presence had any effect on his physiological responses, he was asked to rate the other subject on a 6-point scale ranging from 1 (not very competent interpersonally) to 6 (very competent interpersonally). The remaining questions were filler items that related to physiological matters. After these measures were obtained, all subjects were thanked and told to call the author next month if they wanted to know the purpose and results of the study.

Results

Before examining whether or not the amounts of money wagered varied as a function of the competence of the confederate, it is important to make sure that the confederate was indeed perceived differentially in the two conditions. The mean rating of the confederate's competence was 4.8 when he was supposed to be dapper and 3.17 when he was playing a schnook. There was almost no overlap between the two conditions. The difference between the two means is highly significant ($t = 5.46$, $p < .005$). Therefore, it is safe to say that subjects in the dapper condition saw themselves as competing against a more competent individual than subjects in the schnook condition.

It will be recalled that subjects could wager anywhere from nothing to 25¢ on each of four rounds of betting. These four bets were averaged to give a single score for each subject. The mean bet for subjects in the dapper condition was 11.04 as compared with 16.25 for subjects in the schnook condition ($t = 2.39$, $p < .025$). The difference between the two groups should be even more apparent when we examine the first bets made, since the first round of betting most closely followed the experimental manipulation. The mean first bet for the dapper condition was 9.28, while the mean first bet for the schnook condition was 16.72 ($t = 3.16$, $p < .005$).

Conceptual Test of the Manipulation

In order to make sure that the assumption that Yale subjects expect the attractive confederate to bet more than the unattractive confederate was true, two questionnaires were administered to random samples of Yale undergraduates. On the first questionnaire, the task and the participants were described and subjects were asked whom they thought would bet more. Twelve of the 16 subjects expected the attractive person to bet more ($\chi^2 = 4$, $p < .05$). The second questionnaire described the task and asked people how much they thought they would wager on each trial. All of the 15 subjects asked responded with the maximum wager (25¢).

EXPERIMENT 2: EFFECTS OF CHOICE ON THE ILLUSION OF CONTROL

Once again, it was hypothesized that when a chance situation mimics a skill situation, people behave as if they have control over the

uncontrollable event even when the fact that success or failure depends on chance is salient. A lottery provides a vehicle for studying this illusion of control because, apart from the decision of whether or not to buy a ticket, the outcome is entirely governed by chance. If one *could* exert control over the outcome of a lottery, one would increase the likelihood of having one's ticket selected. This ticket would then be of greater value than a ticket belonging to someone without this control. And if it were of greater value, it then follows that one would require a higher price from a potential buyer.

In the following study a lottery was conducted to assess the effects of choice, an important factor in a skill situation, on the illusion of control. It was predicted that subjects who were given their choice of lottery ticket would require a higher price for it.

Method

Subjects

The lottery tickets were made available to adult male and female office workers employed by one of two firms located in Long Island, an insurance agency and a manufacturing company.[1] Since various drawings and sports pools were not uncommon to these offices, an elaborate justification for running the present lottery was unnecessary. With the exception of four females, all people approached by the alleged ticket agent purchased lottery tickets. Subjects were randomly assigned to conditions with the result that there were 24 males and 3 females in the choice condition and 23 males and 3 females in the no-choice condition.

Materials

The lottery tickets were standard 4×2 inch (10.16×5.08 cm) football cards. On each card appeared a famous football player, his name, and his team. The cards were alphabetically arranged first by team name and then by the individual player's name. There were two matched sets of tickets, each comprising 227 football cards. Each subject kept the ticket from one set while the same ticket from the other set was deposited in a cardboard carton from which the winning ticket would later be selected.

Procedure

The lottery was conducted by a male employee of the insurance agency and a female employee of the manufacturing firm 1 week prior to the 1973 Superbowl game. Both experimenters were blind to the hypotheses of the study. They each approached the members of their respective offices and asked them if they wished to purchase a lottery ticket costing $1. Subjects were told that the tickets were being sold in both their office and in another office (the other office was named) and that the entire pot, approximately $50, would go to the winner. Subjects were also informed of the date of the drawing. After having agreed to enter the lottery, the first subject approached was given the box of cards and told to select the ticket(s) he wanted. The subject named the card so that the experimenter could select the same card from the second set and deposit it in the closed carton. At this time the experimenter also recorded the subject's name and the card selected. The second subject approached was treated in the same manner except that after agreeing to enter the lottery, he or she was handed a card which matched the choice of the preceding subject. Subjects were thus alternately placed in the choice or no-choice condition. The day after the tickets were sold in one office, the same procedure was carried out in the second office.

Dependent Measure

All subjects were individually approached by the experimenter from whom they purchased their ticket the morning of the lottery drawing. They were each told: "Someone in the other office wanted to get into the lottery, but since I'm not selling tickets any more, he asked me if I'd find out how much you'd sell your ticket for. It makes no difference to me, but how much should I tell him?" The amount quoted constituted the dependent measure. In the event that a subject said that he would not sell his ticket, the experimenter was instructed to prod him until he gave a figure and then to record the response "won't sell" alongside of the amount he finally offered.

Results

As predicted, the choice manipulation had a considerable effect on the value of the lottery ticket. The mean amount of money required for the subject to sell his ticket was $8.67 in the choice condition and only $1.96 in the no-choice condition ($t = 4.33$, $p < .005$). Although they were asked how much they would sell their ticket for rather than if they would sell, 15 subjects initially responded that they would not sell. Of these, 10 subjects were in the choice condition and five in the no-choice condition ($p < .10$). The difference previously cited, however, was not simply a function of the amounts quoted by these subjects after prodding, since their

[1] The firms wish to remain anonymous.

responses ranged from \$3 to the entire pot of \$53, with only 3 subjects in the last category.

While not specifically tested until the following study, one of the results obtained in this study concerns the effect of familiarity on the illusion of control. Females are not as likely as males to be familiar with the game of football. Hence, they should be less likely to enter the lottery in the first place, and if they do enter, they should require less money to sell their ticket. It should be recalled that only four persons refused to participate in the lottery and that each of them was female. Of the six females that did enter, four asked \$1 and two asked \$2 for their tickets. Thus the mean amount for females was \$1.33 as compared with \$5.89 for males ($t = 2.14$, $p < .05$).

EXPERIMENT 3: THE EFFECTS OF STIMULUS FAMILIARITY ON THE ILLUSION OF CONTROL AND A REPLICATION OF THE EFFECTS OF CHOICE

In a skill situation one does not feel much control if the object to be controlled is unfamiliar. Under those circumstances one does not know what strategies to rehearse or what responses will bring about the desired outcome. The same result is assumed to obtain in a chance situation; that is, familiarity is expected to increase the illusion of control. Once again a lottery was employed to test this assumption. The lottery tickets were either familiar (letters of the alphabet written on index cards) or unfamiliar (line drawings of novel symbols). Subjects were given the opportunity to keep their original ticket or to trade it in for a ticket in a lottery where the chances of winning were better. Since this was seen as a stronger measure of illusory control than that used in the last study, choice was once again manipulated. Thus the following study utilized a 2×2 factorial design with familiarity and choice as the relevant variables.

Method

Subjects

All subjects were adult males who were employed by the same two firms as those used in Study 2. There were 13 subjects who were randomly assigned to each of the four conditions in basically the same manner as in the last study. Of these, 5 subjects in each condition had participated in the previous lottery.

Materials

Two separate lotteries were run simultaneously. The lottery tickets were pieces of white cardboard 2×3 inches (5.08×7.62 cm) with the words "lottery ticket" printed on them. For the familiar set of tickets, one letter was printed on each of 26 cards. For the unfamiliar set, 1 of 26 esoteric symbols modeled after symbols that printers use appeared on each card. There were two sets of each kind of ticket.

Procedure

The male experimenter of the last study served as the experimenter for the present investigation. His presence in either establishment was not unusual, since he was currently employed by one of the firms and was previously employed by the other. The experimenter was blind to the major hypotheses of the study. The rules for both of the present lotteries were the same: The pot was fixed at \$25, each ticket cost \$1, and only one ticket was allowed per customer. The subjects were given these rules and were also informed that there were only 26 tickets available. Subjects were only aware of one lottery at this time.

Subjects in each firm were approached individually by the experimenter who randomly assigned them to either the choice or no-choice condition in one of the two lotteries. The assignment to condition was carried out in such a way that each subject in the choice condition had at least seven tickets from which to choose and both firms were similarly represented in each condition. Subjects in choice conditions were given the cards and told to make their own selection. After so doing, they were asked the reason for their choice. All subjects kept their tickets while a duplicate was placed in a carton (separate for each lottery) for the drawing.

Dependent Measure

The experimenter contacted all subjects by telephone 2 days before the drawing. The apparent reason for the call varied from subject to subject. After approximately 5 minutes of conversation the experimenter casually brought up the topic of the lottery:

> You bought a lottery ticket didn't you? I was running out of lottery tickets in the lottery you're in, so I started another separate lottery on the same basis with a fixed pot of \$25. Twenty-six people bought tickets in the lottery you're in and 20 people bought tickets in the other lottery. It makes no difference to me, but if you'd like, I can exchange your ticket for one in the other pool. By the way, don't mention this to anybody. [This last sentence was included so that it would appear

TABLE 1

PROPORTION OF SUBJECTS WHO WANTED TO KEEP ORIGINAL TICKET, STUDY 3

Condition	Letter	Symbol
Choice	.62	.38
No choice	.38	.15

Note. $n = 15$ per cell.

as if the offer were being made available only to this subject.]

The dependent variable then was whether or not the subject wanted to exchange his ticket when his objective chances of winning were 1 in 26 for a ticket in another pool where his objective chances of winning would be 1 in 21.

In the event that the subject wanted to buy a ticket in the second lottery and keep his first ticket as well, he was told that he could only be in one or the other, since those were the rules the experimenter had initially laid down.

Results

Both stimulus familiarity and choice yielded the predicted effects on the probability of keeping the original ticket. Table 1 shows the proportion of subjects in each condition who chose to keep their original ticket rather than improve their chances of winning by entering the other lottery. These scores were transformed into arc sines, and the analysis of variance yielded Z scores $= 1.83$ ($p < .05$, one-tailed) for both the main effect of the familiarity variable and the choice manipulation.[2]

If one examines the responses of subjects in the choice condition of the letter lottery as a function of the number of tickets available when given this choice, the effects of choice for a familiar stimulus appear even stronger than those suggested above. Four out of the five subjects in this condition who wanted to make the trade were the last subjects sampled. Thus, they had the smallest number of tickets from which to choose.

Each subject who gave a reason for his choice later chose to keep his original ticket. Five subjects chose letters that stood for their last names, one selected the initial for his wife's first name, one wanted the first letter in the alphabet, and one wanted the last. Simply stating a reason, however, was not a necessary condition for the subject to keep his ticket. No subjects in the choice condition in the symbol lottery gave reasons for their choices, although several kept their original ticket.

[2] See Langer and Abelson (1972) for a discussion of the use of the arc sine transformation in this context.

EXPERIMENT 4: EFFECTS OF RESPONSE FAMILIARITY AND ACTIVE INVOLVEMENT ON THE ILLUSION OF CONTROL

The present study employed a piece of equipment that could be programmed to distribute outcomes randomly. The study attempted to determine whether or not familiarity with the response one is required to make induces the illusion of control. Response familiarity, or practice, increases one's control in skill situations; thus, it is predicted that the same result will obtain in a chance setting. In addition to the manipulation of familiarity, the level of active involvement was varied. In skill situations, the more one actively participates in the event, the more control one has over the outcome. Hence, it is predicted that the greater one's active involvement in a chance event, the greater the illusion of control.

Method

Subjects

There were 13 adult female and 2 adult male employees of the Southern New England Telephone Company in each of four conditions. Subjects were approached while either on a lunch or coffee break by the author and were asked to participate in some marketing research by examining a product in an early stage of development and then answering a few questions about it. Subjects were then escorted to a room in which there were signs bearing the name "Instrumental Organon Corporation" (the name was chosen to account for the IOC printed on the apparatus) and introduced to a female experimenter who randomly assigned them to one of the experimental treatments. The experimenter was blind to the hypotheses being tested.

Apparatus

The IOC apparatus is a $17 \times 17 \times 4.5$ inch ($43.18 \times 43.18 \times 11.43$ cm) black wooden box with an epoxy glass top on which three interconnected paths are etched in copper (see Figure 1). The apparatus has a stylus which when placed on one of the paths, may complete a circuit and ring a buzzer. There are

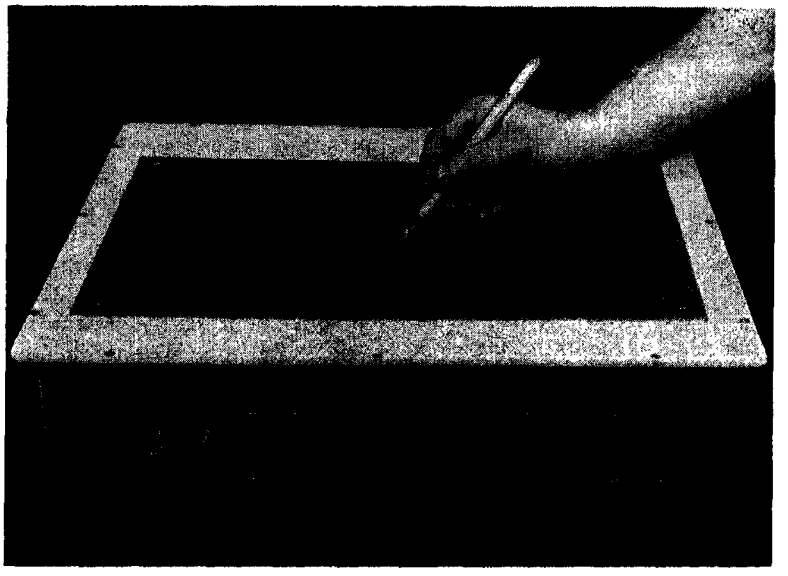

FIGURE 1. Illusion of control apparatus. (In the actual experiment the subject is situated on the side of the apparatus opposite to the switches.)

10 switches located at the side of the box, which may be preset to determine which path on each of the 10 trials will be activated by the stylus. A buzzer will sound if the stylus is on the selected path for more than 10 sec; however, it may sound almost immediately on contact. (The motor-operated switch closes the circuit for about 2 out of every ten sec.) There is a selector switch which gives the option for all or none of the paths to be active. When set so that all of the paths are active, the buzzer will sound no matter which path the stylus is on; when set so that the paths are interactive, the buzzer will disengage.

Procedure

The present study utilized a 2×2 factorial design to evaluate the relative effects of involvement and familiarity. Involvement was manipulated in the following way:

High involvement. Subjects were shown the three paths on the machine and were told that the machine was preprogrammed so that on a random basis when the stylus was on just one of these paths a buzzer would sound at some point while the path was being traveled. The object of the game was to guess the path that they thought would set off the buzzer on that trial and travel down this path with the stylus. With the machine turned off, the experimenter demonstrated the task.

Low involvement. In the low-involvement conditions the experimenter, rather than the subject, manipulated the stylus on the route that the subject had preselected. The instructions and demonstration were otherwise the same as above.

After the apparatus was shown and the task explained to the subjects, familiarity was manipulated.

High familiarity. In the high-familiarity conditions, the subject was told that the plug on the machine had just broken and had to be repaired before they could start. The experimenter suggested that the subject become familiar with the machine and practice while she repaired the damage. The experimenter took approximately 2 minutes to restore the plug to working order.

Low familiarity. In the low-familiarity conditions subjects began the task without this familiarization period.

Dependent Measures

Before the trial on the apparatus, all subjects were asked to rate how confident they were that they would select the correct path on a 10-point scale ranging from 1 (very unsure) to 10 (pretty certain). Subjects were then given a successful trial on the apparatus, which was followed by a questionnaire. The relevant question asked subjects to rate how their performance on the apparatus would compare with that of a champion chess player if they were each given five trials. The scale used ranged from 1 (much worse) to 10 (much better). All other items were filler questions centering around the marketability of the product.

Results

Table 2 presents the mean pretrial confidence ratings for the four groups. The analy-

TABLE 2

MEAN PRETRIAL CONFIDENCE RATINGS OF SUCCESS ON ILLUSION OF CONTROL APPARATUS, STUDY 4

Familiarity	Involvement: High	Involvement: Low
High	6.07	5.67
Low	5.67	3.80

Note. $n = 15$ per cell.

sis of the variance of these ratings yielded significant main effects for both familiarity and involvement, $F(1, 56) = 4.71$, $p < .05$, in both cases.

Similar results were obtained in response to the question that asked subjects to compare their expected performance with that of a champion chess player. Table 3 presents the mean ratings for this question for the four groups. Once again the analysis yielded significant main effects for both familiarity and involvement: for familiarity, $F(1, 56) = 7.33$, $p < .01$; for involvement, $F(1, 56) = 4.25$, $p < .05$.

EXPERIMENT 5: EFFECTS OF PASSIVE INVOLVEMENT ON THE ILLUSION OF CONTROL IN A FIELD SETTING

The more thought one gives to a skill event, the more probable it is that one will come upon strategies that will increase the likelihood of success. Thus greater passive involvement usually results in greater control. It is predicted that when involvement is increased in a chance situation, there is also an increase in the perception of control, the illusion of control.

Yonkers Raceway provided an opportunity to test this idea in a field setting. For a short period of time, Monday night was "give away night" at the racetrack. By virtue of having paid an entrance fee, all of the racetrack's customers were automatically participants in a lottery where the winner would be selected late in the night. People were approached at different points in time and asked to rate their confidence in winning the lottery. It is likely that the more time there is available for thinking about an event, the more time people will spend in such thought. Thus it was predicted that confidence would increase over time. Since it was assumed that men have greater involvement in the races than women, there should be less thought about the lottery for the former group. Therefore, if there are sex differences regarding confidence in winning the lottery, they should be in the direction of greater confidence for women than men.

TABLE 3

MEAN CONFIDENCE RATINGS OF SUCCESS IN COMPARISON WITH CHESS PLAYER, STUDY 4

Familiarity	Involvement: High	Involvement: Low
High	7.00	5.67
Low	5.33	4.53

Note. $n = 15$ per cell.

Method

The procedure for the lottery as set down by the racetrack was as follows: Upon entering the track, people were given lottery tickets to fill out. They were told to put their names and addresses on the half of their stub to be deposited in a big barrel near the entrance and to keep the remaining half for verification if they won. The winner did not have to be present at the drawing in order to claim the prize. The drawing took place after the ninth and last race.

Three color televisions were given out the week before this study was conducted. Unbeknownst to the author until her arrival at the racetrack, the prize for the week in which the present investigation was run was a $2,000 college scholarship. This seemed an odd prize to be given away at a racetrack and did not appear to be one that would lend itself to much thought on the part of the track's visitors. However, instead of announcing this prize, whenever the track officials mentioned the drawing over the public address system, they referred to the Cadillac that was to be given away the following week. Therefore, many of the people in the present study thought that a Cadillac was the current prize.

One female and one male experimenter blind to the experimental hypothesis helped the author conduct the present investigation. Twenty minutes before the first race, the fifth race, and the ninth race, the experimenters approached adult males and females and asked them if they would answer a question for a survey concerning the prizes to be given out after the ninth race. Subjects were handed a form which asked them to indicate, on a 10-point scale, how confident they were that their ticket would be selected at the drawing. The scale ranged from 1 (I'm sure I won't win) to 10 (I've got a really good chance). In Time Period 1, 49 females and 73 males were approached; in Time Period 2,

54 females and 88 males were approached; and in Time Period 3, 62 females and 83 males were approached.

If anyone questioned what the prize would be, he or she was told that the experimenter did not know but that last week three color television sets were given away. The racetrack official announced the prize for the following week on two occasions: once after the first race but before the fifth and once after the fifth race but before the ninth. Immediately after the seventh race, both the prize for the present drawing and the prize for the future drawing were mentioned. The first part of the message regarding the present drawing, however, was virtually masked by shouts from the winners and losers of the last race.

Results

Table 4 presents the mean confidence ratings for both male and female subjects at the three different points in time. The analysis of variance of these data yielded a significant main effect for time, $F(2, 403) = 4.09$, $p < .05$, and for sex of subject, $F(1, 403) = 7.58$, $p < .01$. One of the degrees of freedom of the time variable was used to determine whether the main effect for time was due to an increase in confidence from Periods 1–3. The trend analysis yielded an $F(1, 403) = 7.94$, $p < .01$. Thus both sexes tend to become more confident over time, and females appear to be more confident that they will win than males.

EXPERIMENT 6: EFFECTS OF PASSIVE INVOLVEMENT ON THE ILLUSION OF CONTROL IN A CONTROLLED FIELD STUDY

In the last study, confidence in winning appeared to increase over time. However, since there was no way to control for the presence of different types of subjects at the racetrack at different points in time, the results may have been artifactual. In order to retest the prediction that an increase in passive involvement increases the illusion of control under more controlled circumstances, another study was conducted. Involvement in the present investigation was manipulated by encouraging half of the participants in a lottery to think about the lottery on three separate occasions and not encouraging the remaining participants. As in the third study in this series, the illusion of control was measured by each subject's willingness to trade his original ticket for a ticket in a lottery where the objective chances of winning were better. In addition, subjects were asked to rate their confidence that their ticket would be selected. The prediction is that subjects in the high-involvement condition would be less likely to trade than subjects in the low-involvement condition and that high-involvement subjects would report being more confident of winning.

TABLE 4
MEAN CONFIDENCE RATINGS AT RACETRACK, STUDY 5

Sex	Time T_1	T_2	T_3
Male	3.14	3.35	4.05
Female	4.10	3.92	5.11

Note. Higher numbers indicate greater confidence.

Method

Subjects

Adult male and female office workers affiliated with several different companies located in one building in New York served as subjects. They were approached by a male executive associated with one of the firms located in the building and asked if they wanted to participate in a lottery. (The experimenter was blind to the experimental hypotheses.) Those who complied were randomly assigned to either the high- or low-involvement condition. If more than one person occupied a given office, they were each assigned to the same experimental condition. No worker who shared an office with more than three people was included in the study. There were 17 males and 5 females in the high-involvement condition and 14 males and 5 females in the low-involvement condition.

Procedure

Subjects were asked if they wished to participate in an office lottery where the tickets cost $1, only one ticket was allowed per customer, and the entire pot went to the winner. Tickets were sold on Monday, and the drawing took place on the Friday of that week.

High involvement. Subjects in the high-involvement condition were told that they would get their three-digit lottery ticket in installments. It was explained that they would be given their first digit that day, the second digit the next day, and the third and last digit the day after. It was made clear that the order the numbers were in was fixed.

Low involvement. Subjects in the low-involvement condition were given their three-digit lottery ticket on the day of purchase.

Dependent Measures

The day before or the morning of the drawing, all subjects were approached individually by the person from whom they purchased their ticket. After a few minutes of casual conversation, the lottery was mentioned. The subject was told that the demand for lottery tickets exceeded the supply. The experimenter therefore had started another lottery where the pot was fixed at $25, each ticket cost $1, one ticket was issued per customer, and the drawing was again to be held on Friday. The subject was further informed that 25 people had bought tickets in the lottery he was in so that there was $25 in the pot and that only 20 people were in the other lottery. "It makes no difference to me but if you'd like, I can exchange your ticket for one in the other lottery, but please don't mention this to anybody." The primary dependent measure was whether or not the subject wanted to trade his ticket in order to objectively increase his chances of winning. Subjects who wanted to trade were revisited shortly after this by the experimenter, who apologized to them and explained that the remaining tickets had been lost so that the trade would not be possible.

All subjects were approached again on the afternoon of the drawing and were asked to fill out a one-question questionnaire for a survey on the office lottery. The question asked, "How sure are you that your ticket will be selected?" Subjects were asked to indicate their answer by circling a number on a 10-point scale that ranged from 1 (not sure at all) to 10 (pretty good chance).

Results

As predicted, subjects in the high-involvement condition were less likely to accept the offer to improve their chances of winning than were subjects in the low-involvement condition. This may be seen in Table 5, where the number of people in each condition who elected to either keep or trade their ticket is presented as a function of the level of involvement. Of the high-involvement group, 63.6% of the subjects chose to keep their original ticket, while only 31.6% of the low-involvement group elected this option. A chi-square analysis indicates that this difference is significant at $p < .05$ ($\chi^2 = 4.19$).

TABLE 5

NUMBER OF PEOPLE WHO DECIDED TO KEEP OR TRADE THEIR TICKET AS A FUNCTION OF LEVEL OF INVOLVEMENT, STUDY 6

	Involvement	
Decision	High	Low
Keep	14	6
Trade	8	13

In response to the question "How sure are you that your ticket will be selected?" the mean response for the high-involvement group was 6.45 (on a scale in which higher numbers reflect greater certainty), while the mean for the low-involvement group was only 3.00. The difference between the two means is highly significant ($t = 4.16$, $p < .005$). Subjects were asked whether or not they wanted to trade their ticket prior to the time they gave this confidence rating. Thus, it was possible that this difference was a function of subjects' earlier responses rather than a separate measure of illusory control. That is, subjects might have justified keeping their ticket by giving a higher rating. Therefore, another analysis was carried out in which only the ratings of subjects in the two groups whose members chose to keep their original tickets were compared. The mean rating in this case for the high-involvement condition was 8.36 as compared with a mean rating of 3.67 for the low-involvement group ($t = 4.15$, $p < .005$).

Conceptual Test of the Manipulation

In order to make certain that the results were a function of the level of involvement and not some other factor, a random sample comprised of Yale students, located in one of the university's libraries, and employees of Prentice-Hall, located in their respective offices in New Jersey, were asked to fill out a questionnaire that described the study and asked which of the following words—complexity, fun, involvement—best described the difference between the two groups. Of the respondents, 30 believed the difference to be one of involvement, 16 thought it was a difference in fun, and 12 believed the difference was one of complexity ($\chi^2 = 9.24$, $p < .01$).

IMPLICATIONS AND APPLICATIONS

On the basis of the evidence just presented, it seems that subjects do not distinguish chance- from skill-determined events in the way that is suggested by their definitions. The objective contingency does not appear to be the crucial variable governing subjects' be-

havior. Instead, whether or not an event is reacted to as if it is controllable largely depends on factors like competition, choice, familiarity, and involvement, which may be orthogonal to the actual contingency. This has been shown to be the case even in situations that are as clearly governed by chance as a lottery.

The first study dealt with competition in a chance setting and demonstrated that when the illusion is operative, characteristics of one's opponent, for example, his apparent competence, affect confidence in one's own ability to bring about desired outcomes. In the next two studies it was shown that by allowing subjects to make choices, they came to behave as though they had an illusion of control over the outcome. So powerful was the effect of choice in this regard, that subjects who were given choice in a sense gave up the opportunity to exert real control by failing to enter a lottery where their objective chances of winning were better. The same results were obtained for the effects of stimulus familiarity and passive involvement. In the fourth study, which employed the IOC apparatus, it was found that response familiarity, or practice, on a chance task resulted in greater confidence in winning than did no practice. In the same study, greater confidence also resulted when the apparatus was controlled by the subject rather than the experimenter, although in both instances the subject determined the response that would be made.

While the factors manipulated in these experiments are all characteristics of skill situations, the results of a subset of the studies may lend themselves to alternative explanations. For example, in the two studies involving choice, it is possible that subjects chose tickets that were meaningful to them and that because of this rather than an increase in confidence in winning, the tickets were of greater value to them. In response to this conjecture one might argue that a person could easily duplicate his ticket so that he could trade his original ticket to improve his chances of winning the lottery and still have a ticket to save if, for example, having a ticket with his favorite letter on it has some personal value. Or one might argue that it is not the intrinsic value of the ticket but rather the sentimental value that the person attaches to it that is responsible for its increased worth. Even if this "sentiment" interpretation somehow explained the results of the two choice situations, it cannot explain the explicit increase in confidence found in the remaining studies. In any event, taken as a whole, the experiments appear to support the assertion that the more similar a chance situation is to a skill situation, the more likely it is that people approach the chance situation with a skill orientation. In each study either a direct or implicit change in confidence obtained as a function of these skill-related factors (see Table 6).

Why does this occur? People are motivated to control their environment. The importance of control in this context has been widely discussed by both therapists and social science researchers. Whether it is seen as a need for competence (White, 1959), an instinct to master (Hendrick, 1943), a striving for superiority (Adler, 1930), or a striving for personal causation (deCharms, 1968), most social scientists agree that there is a motivation to master one's environment, and a complete mastery would include the ability to "beat the odds," that is, to control chance events. The more difficult a problem is, the more competent one feels in being able to solve it. The greatest satisfaction or feeling of competence would therefore result from being able to control the seemingly uncontrollable.

A second, although not entirely independent, reason is that there is motivation to avoid the negative consequences that accompany the perception of having no control. There has been much research showing that a nonveridical perception of control over an impending event reduces the aversiveness of that event (see Lefcourt, 1973, for a recent review of this literature). A temporary loss of control is anxiety arousing. A chronic feeling of no control is characterized by passivity and giving up in the face of failure. (This point is taken up again in a discussion of the relationship between the illusion of control and learned helplessness.)

In addition to the motivation to control, there is another reason for the lack of discrimination between controllable and uncon-

TABLE 6

SUMMARY OF DATA, STUDIES 1–6

Skill-related factor	Study	Chance activity	Subjects	Dependent measure	Significance level in favor of IOC prediction
Competition	1	Draw for high card	Male students	Amount wagered	<.025
Choice	2	Lottery	Male and female office workers	Price required to sell ticket	<.005
	3	Lottery	Male office workers	Willingness to trade ticket	<.05
Stimulus familiarity	3	Lottery	Male office workers	Willingness to trade ticket	<.05
Response familiarity	4	Apparatus: "guess the path"	Male and female telephone company employees	Confidence rating	<.05
Active involvement	4	Apparatus	Male and female telephone company employees	Confidence rating	<.05
				Confidence in relative performance	<.05
Passive involvement	5	Racetrack	Males and females (variety of occupations)	Confidence rating	<.05
	6	Lottery	Male and female office workers	Willingness to trade ticket	<.05
				Confidence rating	<.005

Note. IOC refers to illusion of control.

trollable events. This is the fact that skill and chance factors are so closely associated in people's experience. That is, there is not only a motivation not to discriminate, but there is often a true difficulty in making the discrimination, since there is an element of chance in every skill situation and an element of skill in almost every chance situation. The former is obvious and needs no further explication here. Examples of the latter are knowing what a good bet is in a game of dice (i.e., knowing the odds) or knowing which slot machines are rigged to give the highest payoffs. (It is a not too widely known fact, for example, that the slot machines at the airport in Las Vegas pay off more often than those located in town.)

Aside from the fact that a given situation contains elements of both skill and chance, the distinction between skill and chance situations is further complicated by the fact that positive outcomes are most often attributed to the action that preceded them. This occurs regardless of the actual contingency because in reality most outcomes *are* caused by the immediately preceding act.

Most germane to the present body of data are the implications this work has for gambling. It is reasonable to assume that participation in legalized forms of gambling may be increased, and thereby bring about a decrease in illegal gambling, by changing the chance activities so that they incorporate such skill-related factors as those discussed in the present investigation. Thus, for example, in order for state lotteries to compete more successfully with the numbers game—whose popularity may be a product of the fact that participants are afforded the opportunity to exert illusory control by choosing the particular combination of numbers on which they wish to wager—it may be efficacious for the various lottery commissions to add this element of choice to their respective lotteries. (This has

recently been done in Massachusetts.) Perhaps people should be allowed to choose a ticket from several categories of tickets so that they can select one that represents something with which they are very familiar. In a similar way, the other factors may be introduced into existing gambling practices, or enhanced where they already exist, in order to increase participation in a particular game.

The present work may also have less obvious implications. The illusion of control is in a sense the inverse of learned helplessness. Learned helplessness is the perception of independence between actions and outcomes. It is the belief that one cannot influence the production of positive events. Just as one may erroneously come to learn an independence between actions and outcomes, so too may one erroneously learn a dependence between actions and outcomes. In the first case, the organism has generalized from an instance where there was no control to a situation where there is control by having attended to the elements that the two situations still have in common. That is, the discriminative stimuli that signaled no control in the past are still present. They are still controlling behavior, although they are no longer valid cues. In the same way, the illusion of control may come about because of attention to cues that were once valid but are no longer. Therefore, when factors like choice, familiarity, involvement, and competition, which in the past signaled controllability, are introduced into a chance setting, they may still function as discriminative stimuli for control behaviors and induce a skill orientation.

Because of some recent and rather important developments in the area of learned helplessness, it may be worthwhile to carry the comparison a step further. Seligman (in press) believes that learned helplessness is the root of reactive depression and that reactive depression may be alleviated by teaching response–outcome contingencies, that is, by teaching control. Seligman, Maier, and Geer (1968) have shown this to be effective in alleviating learned helplessness in dogs, and Dweck (1975) has obtained similar results with children. If, indeed, the illusion of control is the inverse of learned helplessness, then the illusion of control may contribute to manic or hypomanic reactions, since reactive depression is in many ways similar to psychotic depression, the believed counterpart of mania. Mania is characterized by goal-directed overactivity and very high self-esteem. Beck (1967) describes the manic patient as "optimistic about the outcome of anything he undertakes. Even when confronted with an insoluble problem he is confident that he will find a solution" (p. 93). Thus he appears to have an illusion of control. If this is true, then deficient contingency learning, in which the individual misattributes causal effectance to himself as a result of prior training, may be an etiological factor in manic reactions. This speculation and the treatment it suggests should be explored in future research.

It may be meaningful to ask whether an illusion of control is necessarily dysfunctional for the individual. An extrapolation from the present results to the realm of system change implies that this need not be the case. The preference for the status quo is more than likely a function of the security it provides: It is seemingly controllable. Perhaps one way to persuade people to make the change from the old to the new is to make the new more familiar and to increase involvement and participation in the changeover. When this is done, the novelty of the new system may be appreciated because the fear-inducing property of being uncontrollable has been reduced. This idea is hardly new. Businesses, for example, have long known that changes are least resisted when employees are given a good deal of information about the change and are brought into the decision-making policy. What is new, perhaps, is the suggestion that the ways of increasing acceptance of the new system, whatever it be, may not depend on distributing real control when that alternative is impractical. That is, by inducing an illusion of control through the introduction of control-related but outcome-independent factors, people may be put at ease sufficiently to increase their risk taking, that is, to accept the "unknown."

In a similar way, the induction of an illusion of control may improve the well-being

of people in hospitals, old age homes, and mental institutions. In many ways the people in these environments, in an increasing order of magnitude, are deprived of the ability to exert control. This perceived absence of the ability to control is debilitating. When there are good reasons why it is either undesirable or impossible to remove restrictions on freedom, that is, when it is not possible to enable the exercise of real control, it may be advantageous to induce the illusion of control. For instance, using just one of the factors as an illustration, by allowing the patient in the hospital to decide whether he wants an injection of penicillin or a penicillin tablet (when the difference in the amount of time it takes for the medication to get into the bloodstream is not important), he has been given the opportunity to exercise control, although the important decision—that he is going to have penicillin—has already been made. Changes along these lines may have far-reaching gains, while the costs are negligible.

While there exists the very discomforting possibility that persons might attempt to induce an illusion of control in controllable situations in order to prevent other people from exercising real control, it is very possible that such an undertaking would boomerang. The increase in confidence that may result from the introduction of control-related but outcome-independent factors may sufficiently motivate an individual to seek out more rather than less control. For example, giving so-called unimportant choices to people in old age homes may help these people to feel once again that they are capable of making and should be making the kinds of decisions that they once had made. The validity of these speculations is as yet untested but is one that seems to merit further consideration.

When such a consistent set of results in social-psychological research has been reported, as is the case here, it often represents a subset of the studies that were actually performed. Frequently studies that do not turn out precisely as expected and do not provide confirmations of theoretical notions are not presented. However, these studies can be extremely useful in delimiting the boundaries of the phenomena in question; that is, by illuminating the circumstances under which particular phenomena do *not* occur, it is possible to gain a greater understanding of the situations in which they do occur. Below is a brief description of two other related studies conducted in this series which did not confirm predictions but which were informative for that very reason.

The first attempt to examine the effects of choice and passive involvement on the illusion of control was in a lottery conducted in the psychology department at Yale. In that study IBM cards with dates printed on them served as tickets. Subjects either chose their own ticket or were given a ticket and were asked how much they *thought* they would sell it for at one of three times before the drawing. That is, instead of actually being approached by a potential buyer, they were asked to imagine what they would do if they were in that situation. Choice had a very strong effect, but this was only for females, and the effect for time could not be assessed because it was confounded by the particular distribution of females in the various groups. It seemed likely that part of the failure to find the effect of choice for males was a function of the particular males in the population. Many of the responses from male subjects implied a perceived demand to reach a price based on rational or mathematical considerations. For example, along with his reply, one respondent included the formula for the expected utility of the ticket that he used to arrive at his estimation. This study may be contrasted with Studies 2 and 3, where the effect of choice did obtain for males. However, in those studies, subjects were in the actual situation without the perceived demand to be rational.

In another study, a written questionnaire containing an item conceptually similar to the competition manipulation reported in Study 1 was distributed to various populations. A typical version of the question read as follows:

Two people, Dan and Sam, overhear you mention that you're going to buy a lottery ticket. Sam is unattractive and seems rather awkward, while Dan is rather good-looking and seems quite sure of himself. They each

ask you to buy a ticket for them. The ticket agent sells you tickets number 54, 55, 73. You decide to keep ticket 55 for yourself.

To whom do you give number 54? _____
To whom do you give number 73? _____

For most of the groups there was no difference; however, when there was a significant difference, it was in the direction opposite to that predicted. That is, people tended to say that they would give the number closer to theirs, number 54, to Dan, the confident opponent. The hypothetical nature of this question may be contrasted with Study 1, which measured actual behavior in the situation. These studies served to highlight an important aspect of this phenomenon. It would appear that when asked, people are often either unaware of the motivational factors that influence their behavior in chance situations, or they do not wish to appear "irrational."

In conclusion, we can say with a fair degree of certainty that when an individual is actually in the situation, the more similar the chance situation is to a skill situation in outcome-independent ways, the greater will be the illusion of control. This illusion may be induced by introducing competition, choice, stimulus or response familiarity, or passive or active involvement into a chance situation. When these factors are present, people are more confident and are more likely to take risks.

In the immediate future additional research will be undertaken to test the generality of this phenomenon and to validate further the present conception of these findings. The following propositions will be considered:

(a) When control is desirable, that is, when success seems likely, people will seek out factors such as competition, choice, etc.

(b) When control is undesirable, that is, when failure is both likely and costly, people will avoid these factors.

(c) When there is an intrusion of reality such that the focus of attention is shifted back to the chance elements in the situation and away from the skill characteristics that were predominating, the illusion will dissipate.

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