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# Desire for Control and the Illusion of Control: The Effects of Familiarity and Sequence of Outcomes

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Two experiments were conducted to examine the relationship between individual differences in the general desire for control and the illusion of control. In Experiment 1, high desire for control college students bet significantly more than lows in a gambling game when they were playing with familiar cards, but not when playing with unfamiliar cards. In Experiment 2, high desire for control subjects demonstrated the illusion of control in a coin-toss game when they experienced success in anticipating the outcome of the coin toss at the beginning of the sequence. These subjects believed they had performed better on the task and anticipated they would do better on upcoming tasks than low desire for control subjects or subjects who experienced failure at the beginning of the sequence. © 1986 Academic Press, Inc.

That people are not always accurate in their assessment of causation has become a well-established fact among experimental psychologists. Systematic distortions of perceived cause and effect relationships have been found to permeate our efforts to make sense out of the events in the world (cf. Alloy & Abramson, 1979; Nisbett & Ross, 1980). Among the more interesting of these demonstrated errors is the "illusion of control" (Langer, 1975, 1977), the tendency to perceive that one has the ability to influence outcomes that are obviously chance determined. It has been found, for example, that knowing what number to shoot for in a dice game will lead to increased betting, supposedly because the dice thrower believes himself or herself to have a better chance of controlling the outcome (Strickland, Lewicki, & Katz, 1966). People who face an apparently incompetent partner in a chance competition or who are allowed to select their own lottery ticket also have been found to display an increased belief that they will control a chance-determined event (Langer, 1975). Similarly, Wortman (1975) found an increased perception of personal

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control when subjects understood the values associated with the various colors in a marble-selection game. In each case, the more a game of chance resembled a skill-determined situation (e.g., choosing one's own ticket), the greater the illusion of control.

One extension of this research concerns individual differences in susceptibility to the illusion of control. Burger and Cooper (1979) proposed that people who hold a high general desire to control events are more likely to demonstrate the illusion of control than people low in this trait. They compared college students scoring high and low on the Desirability of Control Scale (Burger & Cooper, 1979), a measure of the extent to which people generally are motivated to control the events in their lives. It was found that only the high desire for control subjects displayed the illusion of control, as indicated by the number of chips bet when being told before the toss what the winning dice number would be.

Subsequent research has provided additional evidence for the illusion of control–desire for control link. Burger and Schnerring (1982) found that high desire for control subjects were more susceptible to the illusion of control than lows when knowing the winning suit beforehand in a card-selection game, but only when winning translated into tangible outcomes (prizes). Burger and Smith (1985) found that desire for control scores were able to predict the type of game that problem gamblers bet upon (those with a hint of controllability). These researchers also found that desire for control scores were related to the amount of money the gamblers had lost during their worst year of gambling. Finally, Wolfgang, Zenker, and Viscusi (1984) found that subjects high in the desire for control made larger bets relative to lows in a dice game when the odds suggested a greater chance of success (2 to 1) than when longer-shot odds for success were presented.

This research clearly indicates that individual differences in the desire for control interact with certain situational variables to create an illusion of control over chance-determined events. The present research is concerned with better understanding the situational variables that affect this relationship. Specifically, two variables suggested by past research on the illusion of control are examined: the familiarity of the task and the sequence of task outcomes. Finding a relationship between the desire for control and these variables in an illusion of control situation will provide a better understanding of the reasons for the illusion of control as well as a better understanding of the desire for control construct. In addition, this information could prove useful when applying the illusion of control findings to practical areas, most notably problem gambling.

If, as anticipated, the illusion of control is more pronounced among high desire for control individuals, then a motivational interpretation for the phenomenon would be supported. That is, because a key distinction between high and low desire for control persons is the extent to which

they are motivated to control events, greater illusion of control among high desire for control subjects can be explained in terms of a motivated distortion of perceived causality. The predicted results also would add to our understanding of the desire for control concept. First, Experiment 1 is designed to identify more precisely the variables that contribute to the perception of a task outcome as skill determined. More specifically, the degree of familiarity with the task is expected to affect the perception of similarity to skill-related tasks and therefore to contribute to the effect. Experiment 2 expands the illusion of control–desire for control research to a situation that does not involve winning or losing. Unlike earlier research, this study looks at how high and low desire for control people determine patterns of causality in order to anticipate future events. If the gambling situation findings can be expanded to this nongambling area, high desire for control people should again be more susceptible to the illusion of control and thus ironically be less likely than lows to accurately perceive their amount of control in the situation.

## EXPERIMENT 1

One variable that has been found to affect the illusion of control is the extent to which the task is familiar to the individual. Langer (1975), for example, found that subjects were more willing to trade in lottery tickets 2 days before the drawing when the tickets consisted of unfamiliar symbols than when more familiar alphabet letters were used. In another investigation Langer (1975) found an increased illusion of control when subjects were allowed to familiarize themselves with an unusual mechanical apparatus used in the task. Thus, familiarity appears to be an important situational variable affecting the illusion of control. This seems reasonable in that familiar tasks hint at controllability more than unfamiliar ones (i.e., how can one control something that is unfamiliar?)

If individual differences in the desire for control are important in the illusion of control phenomenon, then it can be expected that people high in the desire for control are more likely than lows to be influenced by the familiarity of the task when in a gambling-type situation. This is because these individuals are so highly motivated to see themselves as in control that they distort their perception of the event in order to see themselves in that light. Admitting that one can not control an event that resembles something controllable (in this case, something familiar) is more difficult for these high desire for control people than it is for lows. In the present investigation college students high and low in desire for control were placed in a gambling situation. It was predicted that high desire for control subjects would bet more than the lows, thus indicating a greater illusion of personal control over the game, but only when playing with familiar objects.

## Method

### *Subjects*

Forty-one male and female undergraduates served as subjects in exchange for class credit. All had taken the Desirability of Control (DC) Scale (Burger & Cooper, 1979) a few weeks earlier as part of a large test battery. The DC Scale is a 20-item self-report inventory designed to measure the extent to which people generally are motivated to control the events in their lives. DC scores have been related to a large number of phenomena theoretically tied to a motivation for control, including depression (Burger, 1984), achievement (Burger, 1985), speech patterns (Dembroski, MacDougall, & Musante, 1984), health-related behaviors (Smith, Wallston, Wallston, Forsberg, & King, 1984), learned helplessness (Burger & Arkin, 1980), and the perception of crowding (Burger, Oakman, & Bullard, 1983). In general, this research finds that high-DC people work harder to establish a sense of control and respond more intensely to challenges to this perceived control than do lows. Thus, high-DC people work harder at challenging tasks, but react to uncontrollable events with greater depression than lows. No connection was made between the scale and the experiment at the time of recruitment.

### *Procedure*

Subjects participated in the experiment one at a time. Upon arriving at the experimental setting, each was informed that the investigation was concerned with gambling behavior and that they would be playing a series of gambling games. Subjects were given 20 poker chips and told they could trade their chips for prizes at the end of the session. The experimenter then showed the subject a prize list which ranged from small prizes (e.g., pencils) to larger prizes (e.g., bookstore gift certificate) and indicated how many chips were needed to win each prize. It was pointed out to subjects that they could win a small prize by not betting anything and thus retaining their 20 chips. The use of prizes was included in the study because Burger and Schnerring (1982) found the desire for control–illusion of control pehnomenon only when subjects were playing for tangible rewards.

The experimenter then explained that the subject would be playing 12 trials of the same game. The game consisted of the subject shuffling and then laying four cards face down on a table. After being told what the winning card was for that trial, the subject was to bet from zero to five chips that he or she could select the card from the four on the table. It was explained to subjects that selecting the winning card would result in a 3 to 1 payoff (e.g., winning nine chips when betting three), and selecting another card would result in losing the bet.

The experimenter then checked a list which had preselected subjects into either the *familiar* or *unfamiliar* condition. Subjects in the familiar condition were given the four aces from a deck of playing cards to play the game with. Subjects in the unfamiliar condition were given four cards, each of which contained a different, unusual symbol.

Each trial began with the subject shuffling the cards and placing them face down on the table. The experimenter then indicated the winning card for the game by holding up a card from an identical deck in a predetermined order. Subjects then announced how much they wanted to bet, selected a card, and either lost their bet or collected their winnings in the form of chips. The experimenter recorded the number of chips bet on each of the 12 trials.

## Results and Discussion

Subjects were divided into high- and low-DC groups via a median split of their DC Scale scores. The dependent variable was the total number of chips subjects bet in the first 10 trials. The chips bet in the last 2

trials were not included to avoid the problem of subjects "going for broke" in their last few bets.

The total number of chips bet was examined within a 2 (high–low DC) × 2 (familiar–unfamiliar) ANOVA. A significant main effect for familiarity was found, $F(1, 37) = 5.00$, $p < .03$, with subjects in the familiar condition betting more than subjects in the unfamiliar condition. In addition, a main effect for the DC variable was found, $F(1, 37) = 23.41$, $p < .001$, with high-DC subjects betting more than low-DC subjects. A significant interaction also emerged in this analysis, $F(1, 37) = 5.18$, $p < .03$. As shown in Table 1, high-DC subjects were more likely than lows to bet more when playing with the familiar cards than when playing with the unfamiliar cards. A subsequent Newman–Keuls test revealed that the high-DC-familiarity subjects bet significantly more ($p < .01$) than did subjects in each of the other three conditions, which did not differ significantly.

The findings thus provide support for the prediction that high desire for control subjects would be more susceptible to the illusion of control, as brought about by the familiarity of the task, than would subjects low in the desire for control. These high-DC subjects apparently were highly motivated to control the outcome of the card game. When playing with unfamiliar cards, high-DC subjects recognized as well as lows that the outcome was largely chance determined. However, the use of familiar cards resembled a skill situation enough so that the high-DC subjects were more likely than lows to see themselves as able to control the outcome of the game.

## EXPERIMENT 2

A second situational variable that has been found to affect the illusion of control is the sequence of the task outcomes. Langer and Roth (1975) had college students participate in 30 trials of a coin-toss game. For some subjects the outcome had been rigged so that they won frequently during the initial trials, but lost frequently toward the end (descending sequence). Other subjects lost frequently at the beginning, but won frequently toward the end (ascending sequence). Langer and Roth found that subjects in

TABLE 1
MEAN NUMBER OF CHIPS BET FOR TEN TRIALS

| | High DC | Low DC |
|---|---|---|
| Familiar condition | 32.33 | 18.50 |
| Unfamiliar condition | 23.11 | 18.75 |

the descending sequence showed a greater illusion of control, as indicated by their reported feelings of control over the 30 trials and their predictions for upcoming trials, than did subjects in the ascending condition. The researchers explain these findings in terms of ability attributions being made during the first few trials. People who win during the first few trials may decide that they have "got it" and will attribute later failures to temporary chance fluctuations which they will be able to overcome with a little more time or effort. On the other hand, losing at the beginning of the sequence should lead to the attribution that one either does not have the ability to control this game or that it is, as should be obvious, a chance-determined event. For these people winning later in the sequence will be seen as chance fluctuation which eventually will even out.

Experiment 2 was designed to examine the role of individual differences in the desire for control in the sequence of outcome–illusion of control relationship. As in the Langer and Roth experiment, college students were given feedback in a coin-toss game indicating either a descending or ascending sequence of winning. It was predicted that descending-condition subjects will perceive greater control over the task outcome and will anticipate greater control over future games than will ascending-condition subjects. Further, it was expected that this effect will be stronger for high desire for control subjects than for subjects low in the desire for control.

## Method

### *Subjects*

Sixty-two male and female undergraduates served as subjects in exchange for class credit. All had completed the Desirability of Control (DC) Scale a few weeks earlier as part of a large test battery. No connection between the test and the experiment was made at the time of recruitment.

### *Procedure*

Subjects participated in the experiment one at a time. The experimenter explained that the research was concerned with individual differences in anticipating events. Subjects were told that "there is a growing interest in psychology in understanding why it is that some people seem to be able to anticipate events better than others . . . (why) some people are able to predict with amazing accuracy what will happen in the stock market, or can anticipate who will win elections or even football games."

The experimenter then introduced the procedure as a very simple anticipation task. It was explained that the experimenter would toss a quarter into the air 30 times. The subject's job was to call each toss heads or tails when the coin was in the air. The experimenter would then catch the coin and announce whether or not the subject was correct.

The room had been arranged so that the subject sat across a table in a desk approximately 2 m from the experimenter. The experimenter set a sheet of paper on a podium next to him or her that supposedly was used to record the subject's responses. Unknown to the subject, the sheet actually contained the sequence of outcomes for the subject's feedback. Subjects had been randomly preassigned to either the *descending* or *ascending* feedback conditions. The experimenter thus announced after each coin toss whether the subject's

guess had been right (R) or wrong (W) in one of the following sequences, as taken from Langer and Roth (1975):

Descending: RRRRWRRRWWWRRRWWRWWRRWWWRWWWR
Ascending: RWWWWRWWWRRWWRWWRRRWWWRRRWRRR

These sequences had been arranged such that in either condition the subject experienced 15 correct and 15 incorrect guesses. The experimenter occasionally showed the coin outcome to the subject, when it coincided with the feedback, to avoid suspicion.

Following the 30 trials, subjects were administered a questionnaire. The questionnaire contained four dependent measures. First, subjects were asked to rate on an 11-point scale (1 = *Very Bad;* 11 = *Very Good*) the extent to which they believed themselves to be good at "predicting outcomes like these." Next, subjects were asked to estimate the number of trials on which they had been able to anticipate the correct outcome. Subjects then were asked to indicate on an 11-point scale (1 = *Not at All;* 11 = *Completely*) the extent to which they believed that their "correct answers were the result of your ability to anticipate events." Finally, subjects were asked to indicate how many coin tosses they would be able to anticipate correctly if 100 more trials were conducted.

## Results and Discussion

Subjects were divided into high and low desire for control groups via a median split of their DC Scale scores. Each of the four dependent variables from the questionnaire was analyzed within a 2 (high–low DC) × 2 (descending–ascending sequence) ANOVA. The means associated with these analyses are presented in Table 2.

Subjects were asked to rate how good they were at predicting outcomes like the coin toss. Only a significant main effect for sequence was found on this variable, $F(1, 58) = 31.88$, $p < .001$, with descending subjects rating themselves as better at anticipating than ascending subjects.

Next, subjects were asked to indicate how many of the 30 trials they believed they had anticipated correctly. Once again, a significant main effect for sequence was found, $F(1, 58) = 14.02$, $p < .001$, with descending subjects believing they had anticipated more correct outcomes than ascending subjects. The DC × sequence interaction fell slightly short of significance, $F(1, 58) = 3.31$, $p < .07$. As shown in Table 2, however, the means appear in the expected direction, with high-DC subjects believing they had more correct guesses than lows in the descending condition,

TABLE 2
ILLUSION OF CONTROL MEASURES AS A FUNCTION OF SEQUENCE AND DESIRE FOR CONTROL

| | Descending | | Ascending | |
|---|---|---|---|---|
| | High DC | Low DC | High DC | Low DC |
| Good at predicting outcomes | 6.87 | 6.10 | 4.64 | 4.77 |
| Number correct in 30 | 16.40 | 15.10 | 12.21 | 13.62 |
| Answers result of ability | 5.40 | 3.50 | 3.07 | 3.38 |
| Number anticipate correct in 100 more trials | 59.87 | 50.45 | 42.36 | 47.46 |

but believing they had fewer correct guesses than lows in the ascending condition.

Subjects also were asked to rate the extent to which they perceived their correct answers were the result of their ability to anticipate events. A main effect for sequence was uncovered, $F(1, 58) = 5.30$, $p < .03$, with descending subjects once again attributing their correct answers more to ability than ascending subjects. A significant interaction also was found on this measure, $F(1, 58), = 4.69$, $p < .04$. As seen in the table, high-DC subjects in the descending condition were more likely than low-DC subjects to attribute their correct responses to ability. There was a slight tendency for the opposite pattern in the ascending condition. A Newman–Keuls test found that the high-DC-descending subjects attributed their correct responses to ability significantly ($p < .05$) more than subjects in the other three conditions, which did not differ significantly.

Finally, subjects were asked to estimate how many correct guesses they would make on 100 additional trials. A significant main effect for sequence was found, $F(1, 58) = 12.80$, $p < .001$, with descending subjects predicting more correct guesses than ascending subjects. In addition, a significant interaction was found, $F(1, 58) = 6.82$, $p < .01$. As shown in Table 2, high-DC subjects in the descending condition expected more correct guesses than did low-DC subjects in this condition. However, high-DC subjects predicted fewer correct guesses in the ascending condition than did low-DC subjects. A subsequent Newman–Keuls test found the high-DC-descending subjects differed significantly from the two ascending condition subjects, $p < .05$. No other significant effects were found in this test.

The results thus provide support for the prediction that individual differences in the desire for control would affect the illusion of control brought about by winning at the outset of a series of chance outcomes. The pattern that emerged in the dependent variables was that high-DC subjects tended to be more susceptible than lows to believing they had the ability to anticipate the coin-toss outcome when they were successful in guessing the outcome at the beginning of the sequence. This is consistent with earlier research findings indicating that high desire for control individuals are so motivated to see themselves in control that they are easily fooled into perceiving control or ability when such controllability is hinted at by situational variables (in this case, the outcome sequence). Because both high- and low-DC subjects received the instructions suggesting that some people may be better able to anticipate events than others, a demand characteristic interpretation of this finding does not seem plausible.

It is interesting to note, however, that the other side of this effect also emerged. That is, high-DC subjects also appeared to be more likely than lows to perceive themselves as not having control when they experienced

a series of failures to anticipate at the beginning of the sequence. This finding suggests that high-DC people may be generally more concerned about who or what has control and therefore are likely to make attributions about control more readily than low-DC individuals. This reasoning is consistent with other research with the desire for control construct which finds that high-DC people are more likely to engage in attributional processes than are low-DC people (Burger & Hemans, 1985).

## GENERAL DISCUSSION

The results of the two experiments provide additional information about the illusion of control as well as the desire for control construct. The two situational variables examined here were found to create an increased perception of control over events that were otherwise obviously chance determined. The findings thus provide a replication of earlier investigations. More important, however, it appears that not everyone is equally susceptible to the illusion of control. In these two experiments and in earlier research it has been found that people high in the desire for control are more likely to demonstrate the illusion of control effect than are those low in the desire for control.

The findings can be interpreted as consistent with a large body of research which indicates that individual motivations are at least partly responsible for systematic distortions of perceived causality. If the difference between high and low desire for control people is a motivational one (i.e., the extent to which they are motivated to control events), then differences in the susceptibility of high- and low-DC persons to the illusion of control can be seen as evidence that the phenomenon is determined by a motivated distortion. That is, in answering the question of why people sometimes succumb to the illusion of control, it can be proposed that they do so to satisfy a motivation to perceive themselves as in control. Hence, the stronger the motive to control events, the more likely the individual will distort perceptions of control in a way that satisfies this motivation.

An indication of how this difference in motivation results in differences in perceived control is suggested by some data from Experiment 2. High-DC subjects appeared to be more likely generally to make attributions about their ability to control events, either in a positive or negative direction. It may be, therefore, that the increased susceptibility to the illusion of control may be partly caused by a greater tendency to process information along the lines of controllability.

On the practical side, research on individual differences in the desire for control and the illusion of control have been tied to gambling behavior (Burger & Smith, 1985). Although the relationship between desire for control and gambling appears to be a complex one, the results of the

present investigations suggest some important variables. For example, if, as Burger and Smith (1985) speculate, gambling behavior is influenced by an illusion of control, then early experiences with winning may play a role in the maintenance of gambling behavior, particularly for high-DC persons. Just as the subject who guessed correctly on the first few coin-toss trials began to see himself or herself as possessing the ability to anticipate the event, so might the person who picks several winners the first day at the racetrack develop a sense of personal ability to anticipate race outcomes. The results of these and other studies also suggest that limiting a gambler's betting to only those games that do not hint at controllability (e.g., bingo as compared with poker) might be a successful strategy for avoiding the illusion of control and the subsequent excessive betting found in laboratory investigations.

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