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The Deployment of Personal Luck:

Sympathetic Magic and Illusory Control in Games of Pure Chance

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Abstract

In three studies we expand on Langer's (1975) illusion of control model to include perceptions of personal luck as a potential source of misperceived skillful influence over noncontrollable events. More specifically, we examined the possibility that people believe they can deploy a personal form of luck in attempts to control games of pure chance. In an initial study ($N = 50$), we predicted and found that having choice in a game of chance heightened both perceived personal luck and perceived chance of winning. In our second ($N = 34$) and third studies ($N = 60$), we tested hypotheses based on the proposition that luck perceived as a personal quality follows the laws of sympathetic magic (Frazer, 1890/1959). The results of these latter studies showed that participants acted as though luck could be transmitted from themselves to a wheel-of-fortune and thereby positively affect their perceived chance of winning. Results were discussed both in terms of the previously unexamined connection between illusory control and beliefs in sympathetic magic and as an extension of the illusory control model.

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When people blow on dice before throwing them, what are they trying to do? They are trying to control the fall of the dice and thereby enhance their chance of winning. Why do lottery vendors usually permit players to select their own numbers? They do so because they know, at least implicitly, that many players believe they can enhance their chances of winning by choosing the numbers themselves.

If people approach their understanding of the world in a rational, scientific manner, they should view random events as being outside their control (e.g., Weiner, 1974, 1998). From a scientific standpoint, people should understand that they cannot intentionally pick winning lottery tickets and cannot influence to their benefit the roll of dice, the fall of a roulette ball, or the alignment of wheels on a slot machine. Langer (1975) developed her illusion of control model in part to account for such departures from rationality. The illusion of control is defined as “an expectancy of a personal success probability inappropriately higher than the objective probability would warrant” (Langer, 1975; p.313). According to Langer, the illusion of control emerges because people sometimes overextend their belief in their abilities to control truly mutable events through conventional means to the control of truly immutable ones. That is, the illusion of control may be understood as a pair of related errors made during some chance situations. First, people misperceive the chance event as being controllable. Second, people believe that they have and can use a conventional ability to control the outcome of the event.

In Langer’s (1975) Experiment 2, an experimenter approached people in their workplaces with a request to purchase a lottery ticket. Participants who agreed were either permitted to choose their ticket from an array or were given a ticket by the experimenter. Before the lottery

draw, participants were asked the amount for which they would resell their tickets. Participants in the choice condition set the value of their ticket at a significantly higher level than did participants in the no-choice condition (by a margin of nearly 4.5 to 1). The choice manipulation is a critical component of this test of the illusory control model. Only participants in the choice condition had an opportunity to misperceive a link between their behavior (i.e., choosing a ticket) and the outcome of the lottery. Believing that they had engaged in a skillful choice of a lottery ticket, choice condition participants then would have estimated that they had a better chance of winning the lottery than participants would have in the no-choice condition.

An interesting question to pose is what conventional ability people in situations like Langer's lottery ticket study could imagine themselves to have and use. One possibility is that people overextend their belief in a general ability to select good items from available choices, like picking a good head of lettuce from grocer's display. Generalization of this ability would be more appealing if it were not for the fact that lottery tickets are much more similar to one another than are heads of lettuce. Some heads of lettuce are crisp and others are wilted; some have rust and others do not. The relevant skill in choosing a good head of lettuce, then, is knowledge about physical signs of freshness. But lottery tickets lack obvious distinguishing features, other than numbers, and it is difficult to imagine a conventional skill that people could overextend to making good choices among them. On the other hand, we can imagine an unconventional ability and related deployment processes that work well within Langer's conceptualization of illusory control—self-perceived personal luck and the principles of sympathetic magic.

The word luck can be used as a referent for a personal quality of both individuals (a “lucky stiff”) and groups (“the luck of the Irish”). Wagenaar and Keren (1988) have shown that people

conceptually distinguish between chance events and what we refer to as personal luck, with the former term capturing the traditional, situational aspect of random events, and the latter term capturing people's belief in a deployable personal skill. If luck can be thought as a quality possessed by persons, this personalized component would provide a perceived ability which could be used to exert control over what would otherwise be considered a chance event.

Anecdotal evidence for the operation of this type of thinking in gambling situations comes from studies in which participants thought aloud while playing roulette, slot machines (Gaboury & Ladouceur, 1988) and poker machines (Walker, 1992). Participants in both studies were reported to have made many irrational strategic statements, some of which seemed to implicate luck as a personal quality. For example, after winning a bet at a game of chance, one participant spontaneously announced, "I'm lucky today, I should buy a lotto ticket" (Walker, 1992).

But how could one purposively use this personal luck in the service of controlling the uncontrollable? One intriguing possibility is that of sympathetic magic (Nemeroff & Rozin, 2000; Rozin & Nemeroff, 1990). Sympathetic magic is the basis for the belief systems of many traditional cultures (Frazer, 1890/1959; Mauss, 1902/1972). In broad terms, sympathetic magical thinking involves

a cognitive intuition or belief in the existence of imperceptible forces or essences that transcend the usual boundary between the mental/symbolic and physical/material realities, in a way that (1) diverges from the received wisdom from the technocratic elite, [and] (2) serves important functions...(Nemeroff & Rozin, 2000, p.5).

In other words, where control over outcomes is important, sympathetic magic permits the consideration of causal forces, such as personal luck, that are not recognized in the world of physical laws and linear causality. Nemeroff and Rozin (2000) propose that people in modern

cultures also attempt to influence events in their lives, at least some of the time, through sympathetic magic. We examine here the possibility that they do so when playing games of pure chance.

Consider now, within the context of sympathetic magic, an elaboration of Langer's illusion of control model. Games of pure chance represents a classic condition under which people may engage in magical thinking—when scientific laws are unhelpful (e.g., Malinowski, 1955). Thus, the person might subjectively convert the pure game of chance into one in which the outcomes are controllable through magical intervention. That intervention might be seen as possible through the use of the unconventional ability of personal luck. From this perspective, the greater expectancy of winning in the choice condition than in the no-choice condition of Langer's (1975) lottery study would have developed because choice participants, but not no-choice participants, would have perceived an opportunity to exercise their unconventional skill of personal luck. By analogy to Langer's reasoning that people overextend conventional abilities when they transform uncontrollable events to controllable ones, we believe that in games of pure chance people inflate their self-perception of luck when choice is provided. This inflated self-perception of personal luck, in turn, promotes an illusion of control over the pure game of chance. Our extension of Langer's illusion of control model therefore centers on the process by which people believe that they can control that which is objectively under the control of pure chance and to which normal abilities do not apply.

Preliminary Study and Study 1: Using Luck as a Guide for Making Choices

Although prior work convincingly shows that giving people choice in games of chance influences their judgments of success likelihood, those results do not necessarily mean that people want such opportunities to exercise choice. It could be the case that the base-rate of actual

desire for control in pure games of chance is trivially low, despite the fact that giving people choice in such situations might well engage documentable psychological processes. If this were the case then, studies in which control opportunities were assessed would themselves be somewhat trivial. A preliminary study was conducted to determine the base-rate desire for control in a game of chance that represented the family of games that formed the context for our experimental studies.

Preliminary study. We measured whether university student participants preferred selecting a lottery number themselves or having the experimenter select for them. Participants were directed to a fish bowl filled with 56 numbered Ping-Pong balls. The experimenter explained that as a token of appreciation for taking part in the research project, participants would be entered into a draw for a \$20 gift certificate from a local music store. Participants were told that if the number of their Ping-Pong ball matched the number randomly selected after all sessions of the study were completed (s)he would win the gift certificate. The participant was asked, “Would you like to pick a Ping-Pong ball or shall I pick a ball for you?” Of the 25 participants, 22 (88%) chose to select their own ball, $\chi^2(1, N = 25) = 14.4, p < .0001$. Thus, nearly all participants preferred to engage in an act normally associated with control over outcomes by taking advantage of the experimenter’s offer to let them choose their own lottery ball. This preliminary study provides direct evidence that people want to exercise control-like behaviors in true games of chance.

Recall that our general hypothesis is that people believe that they have a personal quality of luck that can be used to control logically uncontrollable games of chance. Our preliminary evidence indicates that people want to engage in control-like behaviors when playing a game of pure chance, but it did not address the underlying issue of how they thought they could do so.

We expand the illusory control conceptualization here to include the possibility that the opportunity to exercise choice in games of chance inflates perceptions of personal luck. People then allow their personal luck to guide their choice.

Participants in Study 1 were permitted to choose a scratch-and-win lottery ticket or were assigned one by an experimenter. We predicted that participants who were given the choice of ticket would believe themselves to have an enhanced chance of winning, consistent with illusion of control findings (e.g., Langer, 1975). If our reasoning is correct about the source of this illusion of control, perceptions of personal luck should be heightened for participants in the choice condition compared to those in the no-choice condition. We should also find that self-perceived personal luck is more strongly correlated with self-perceived probability of winning in the choice than in the non-choice condition. A belief in personal luck logically should heighten perceived chances of winning only in the choice condition where participants could consider their luck to be deployable through action (i.e., via personal selection of their tickets).

Study 1: Method

Participants and Design

Participants were 50 male and female University of Alberta undergraduates who received partial credit toward a course requirement. Participants in the two-treatment study were randomly assigned to choose a lottery ticket or to receive one selected by an experimenter.

Procedure

The experimenter greeted individual participants upon their arrival at the laboratory and told them that the study concerned people's knowledge about gambling. The participant first completed a questionnaire designed to support this cover story (e.g., "what is the most popular place for gambling in the world?").

The participant then was shown an official Province of Alberta scratch-and-win lottery ticket display unit. The unit was a 37 cm long x 55 cm wide x 4 cm high wooden box divided into two equal sections along the narrower dimension, both of which were covered by a pane of glass. Twenty scratch-and-win lottery tickets appeared on each side of the display unit.

Participants were informed that as part of the study they would receive a scratch-and-win ticket. Half of the participants were told that before they arrived a computer program had randomly selected their ticket. The other half of the participants were allowed to choose their lottery ticket. After participants received a lottery ticket (but before scratching it) they answered a post-experimental questionnaire, were probed for suspiciousness, and then were fully debriefed.

Dependent Measures

The first section of the post-experimental questionnaire consisted of four 7-point scale items of our own design that assessed expectation of winning, gambling frequency, and perceived personal luck. These items were: “I believe my chances of winning are” anchored at (1) very bad and (7) very good; “How often do you gamble?” anchored at (1) never and (7) more than once a week; “To what extent do you feel that luck is a quality of the person or a quality of the situation?” anchored at (1) quality of the situation and (7) quality of the person; and “If you were to say that you were ‘lucky’ in terms of some event, to what extent do you mean that you are a lucky type of person or that a lucky thing happened to you?” anchored at (1) a lucky thing happened to me and (7) I am a lucky type of person. The second section was the Belief in Good Luck scale (BIGL; Darke & Freedman, 1997). Although the scale was developed to measure stable beliefs about luck, pilot testing showed that it was also sensitive to transitory changes in luck understood as a personal quality. The BIGL scale (internal reliability = .85) consists of

twelve 6-point Likert items anchored at 1 (strongly disagree) and 6 (strongly agree). For example, item 3, item 6 and item 7 ask for agreement or disagreement with the statements, “I consider myself to be a lucky person,” “I consistently have good luck,” and “It’s a mistake to base any decision on how lucky you feel,” respectively. Higher composite scores reflect increasing belief in personal luck.

Results and Discussion

A preliminary analysis revealed no difference in frequency of participants’ gambling between the choice ($\underline{M} = 2.8$) and no-choice ($\underline{M} = 3.0$) of lottery ticket conditions, $\underline{F}(1, 48) < 1$. One-way ANOVAs for gender were conducted on the dependent measures; effects for all dependent measures were nonsignificant, all $\underline{F}s < 1$.

As expected, participants who chose their own lottery ticket reported a greater prospect of winning ($\underline{M} = 3.4$) than did participants who did not choose ($\underline{M} = 2.4$), $\underline{F}(1,48) = 9.37$, $p < .005$. This result is consistent with the Langer’s (1975) illusion of control hypothesis and empirical findings. The illusion of control model explains this result in terms of people’s tendency to be overconfident in their ability to attain outcomes determined by chance. Note that overconfidence is true only in the relative sense of a between-condition difference. The most confident participants, those in the choice condition, rated their chance of winning at just the midpoint of the scale on average. The relatively greater confidence in the choice condition, according to the illusion of control model, occurs because both skill-related and chance factors are present in many situations. During chance events people tend to confuse the two, leading them to overestimate the extent to which personal skills, such as mathematical ability or reasoning capability, contributed to the event’s outcome. According to our analysis of the illusion of control as it applies to games of pure chance, it is people’s perceptions of personal

luck, affected by having the choice of lottery ticket, that creates the difference in people's prospect of winning between conditions.

As we predicted, luck perceived as a personal quality was heightened in the choice condition. Participants who were allowed to choose their own lottery ticket perceived themselves to be luckier types of people ($\underline{M} = 4.04$ versus $\underline{M} = 1.92$), $\underline{F}(1, 48) = 21.97$, $p < .001$, and believed luck to be a quality of the person ($\underline{M} = 3.92$ versus $\underline{M} = 2.11$) more than did those who did not choose, $\underline{F}(1, 48) = 5.01$, $p < .001$. The same result was obtained for the Belief in Good Luck scale ($\underline{M} = 45.13$ versus $\underline{M} = 34.96$), $\underline{F}(1, 48) = 16.49$, $p < .001$.

We also assessed the relationship between self-perceived personal luck and perceived chance of winning. A significant correlation was obtained ($r = .64$, $p < .001$) between the BIGL scale and self-perceived probability of winning in the choice condition. Similar results were found with the two additional luck items of our own design, $r_s = .47$ and $.50$, $p_s < .03$. All correlations between perceived chance of winning and the personal luck measures were nonsignificant in the no-choice condition, all $r_s < .33$. When participants could choose their tickets, estimated chance of winning increased with increased perceptions of luck as a personal quality. When participants could not choose, no relationship was found between self-perceived luck and likelihood of winning. These results are consistent with our reasoning that perceived personal luck would affect expectations of winning only in the choice condition, because only when people had choice in the game could they view their luck as useful in controlling the outcome.

Test of Mediation. Illusion of control findings usually are attributed to participants' mistaken beliefs that they could use ordinary skills to affect truly uncontrollable events. Our results suggest that perceptions of luck as a personal quality may be the mediating variable for

such beliefs in pure games of chance. We followed Baron and Kenny's (1986) regression-based procedure for testing mediation. We first regressed the Belief in Good Luck scale (the mediator) on choice of lottery ticket (the independent variable). We then regressed perceived chance of winning (the dependent variable) on choice of lottery ticket. Lastly, we regressed perceived chance of winning on both choice of lottery ticket and the BIGL. The results of these analyses fulfilled all three of the Baron and Kenny regression criteria for mediation. Choice of lottery ticket had a significant effect on the BIGL scale in the first equation, $t(48) = 4.06, p < .001$; choice of lottery ticket affected perceived chance of winning in the second equation, $t(48) = 3.06, p < .005$; and in the third equation, the BIGL affected perceived chance of winning, $t(48) = 3.40, p < .002$. The final comparative criterion in the Baron and Kenny method was satisfied by the finding that the effect of choice of lottery ticket on perceived chance of winning was less in the third equation, $t(48) = 1.20, p > .20$, than in the second equation, $t(48) = 3.06, p < .005$. These results establish what Baron and Kenny refer to as "perfect mediation." Thus, there is very strong evidence to support our general hypothesis that variations in self-perceived personal luck affect people's beliefs in their ability to control chance events.

Studies 2 and 3: Use of Sympathetic Magic in the Deployment of Luck

The preliminary study and Study 1 show that choice inflates perceptions of personal luck in games of chance. We believe that these results suggest the possibility that when people actively engage in pure chance gambles, linear cause-effect logic is replaced with less rational forms of thought that include beliefs about luck as suggested by many others. We suggest that people not only believe that they have luck, but that they believe they can use it intentionally. For example, in the preliminary study, we suggested that people wanted to choose their own lottery ball not just because personal luck was relevant to the event but because they believed

they could influence their chances of winning. In Study 1, choice condition participants appeared to have believed that they had a greater chance of winning the lottery than did their no-choice counterparts because they had been able to exercise their luck in making their ticket selection. In Studies 2 and 3, we turn to other ways in which people might attempt to intentionally use personal luck.

Take a moment to contrast scientific and magical understanding of control. The use of conventional abilities follows the laws of physical and linear causality. For instance, a skilled carpenter deploys her ability through a sequence of actions with tools that convert building materials into a finished product. Use of the unconventional ability of personal luck, however, would follow the laws of magic rather than those of nature. The two main laws of sympathetic magic are those of similarity and contagion (Frazer, 1890/1959; Mauss, 1902/1972; Rozin & Nemeroff, 1990). According to the magical law of similarity, objects that resemble one another are believed to possess some of the same underlying properties. Moreover, action on one object can produce like effects on like objects. The operation of this law is illustrated by voodoo harm. The voodoo practitioner creates a small model of the person (s)he wishes to injure, and then pierces it with a needle where (s)he intends to injure the target person. Success would be evident in pain experienced by the target person at the corresponding anatomical site. As we noted, belief in the law of similarity apparently is not confined to traditional cultures. For example, Rozin, Millman, and Nemeroff (1986) demonstrated that college students reject otherwise acceptable foods (e.g., fudge) when shaped in the form of a disgusting substance (e.g., dog feces).

According to the other main law of sympathetic magic, contagion, two objects that come in contact can transfer their properties to one another. Rozin, Markwith, and McCauley (1994),

for example, found that college students resisted wearing a sweater owned by an individual with the AIDS virus even after it had been washed and not used for a year. Anecdotally, Albas and Albas (1989) suggest that many North American students engage in contagion-like activities. For example, C. Albas (Rushowy, 2000) reports “Students will wear the sweatshirt of their brilliant boyfriend...[to examinations].” This is a particularly interesting example, because two stages of contagion are implicated. Brilliance is transferred to the sweatshirt by the original wearer, and then the brilliance is transferred from the sweatshirt to the new wearer.

We propose that people often act as though they can deploy personal luck via the laws of similarity and contagion in attempts to control games of chance. The common sight of racetrack bettors kissing their betting slips at post-time, for example, can be understood in this way (although racetrack betting also includes a degree of conventional skill, of course). In order to affect the outcome of the race, the bettor first transfers his luck to the ticket through direct contact (the law of contagion) and then his luck, he implicitly believes, transfers from the numbered ticket to the horse bearing the same number (the law of similarity). That is, by applying the laws of sympathetic magic to deploy personal luck, the bettor gains control, albeit illusory, over the gambling event. We conducted two studies to investigate the link between the sympathetic magic and control-oriented behaviors in games of pure chance.

Study 2: Spontaneous Application of the Laws of Sympathetic Magic

If people perceive luck as a personal possession, they may attempt to transfer their luck onto an object central to a game of chance by physical contact. Pairs of competing participants in Study 2 played a wheel-of-fortune game during which they could handle such objects. Numbered Ping-Pong balls were arranged along the perimeter of a wheel-of-fortune. Each participant made a bet by picking a Ping-Pong ball with a number corresponding to one of those on the wheel-of-

fortune. We predicted that participants would handle their Ping-Pong ball more during their own wheel-of-fortune spins than during their pair member's spins. Only during participants' own turns should attempts to deploy luck through contagion and similarity occur.

Study 2: Method

Participants

A total of 34 female and male undergraduates participated as part of a course credit option. Participants were recruited in gender-paired dyads (i.e., male-male, female-female and female-male). Previously acquainted students were not permitted to participate together.

Procedure and Materials

On entering the laboratory, participants were seated at a table. A divider was positioned so that they were unable to see each other and the table space in front of each other. On both sides of the divider were positioned a clipboard, a pencil, and an elastic band. (These items were present to test an alternative hypothesis: that participants would handle any object present during their wheel-of-fortune spins due to anxiety over whether they would win or lose.)

At the front of the room was a 1.8 meter tall wheel-of-fortune game. The wheel was partitioned into 16 equal sections sequentially numbered 1 to 8 on the top and bottom halves of the wheel. The numbers appeared on halved Ping-Pong balls arranged on the circumference of the wheel. Eight Ping-Pong balls, similarly numbered 1 to 8, were placed inside a goldfish bowl adjacent to the wheel. Other games of chance were located around the room to support the cover story. A poker table was positioned on one side of the laboratory, and on the opposite side was the scratch-and-win lottery ticket display unit used in Study 1.

Participants were told that the study involved individual differences in people's gambling knowledge, and were given the gambling knowledge survey used in Study 1. After completing

the survey, participants chose a Ping-Pong ball from the gold fish bowl and were told:

If the number on your Ping-Pong ball matches the number on which the wheel stops, you win. The two of you will be in direct competition with each other on 10 spins of the wheel. Each of you will get 5 spins, alternating spins between the two of you. The outcome of each spin will only affect the person whose turn it is. The person with the most wins at the end of the 10 spins will be entered into a draw for \$50.

Participants were also told to record their outcomes on a sheet attached to their clipboard by writing “win” or “loss” under a column labeled “My Spin.”

The experimenter then conducted the trial set of 10 wheel spins. Participants’ hands were videotaped during the session from behind a one-way mirror in order to determine the frequency with which they handled the objects on the table during their own and the other person’s turns. The winning dyad member was revealed after the final spin. Participants then completed a questionnaire similar to that used in Study 1. At the conclusion of the session, we informed participants of the videotaping as part of the debriefing and asked permission to score the tapes. Participants were told that if either of them did not consent, the tape would be erased, and that there was no penalty for refusal. All participants granted permission.

Results

One coder scored all tapes for the number of participant contacts with each of the objects in front of him or her during the 10 wheel-of-fortune spins. Scores for each of the participant’s own spins were then summed to create a total own-spin Ping-Pong ball contact score and a total own-spin other-objects contact score. Totals were similarly compiled for contact with the Ping-Pong ball and the other objects during the other person’s spins. Contact was defined as holding

or trapping an object between hand and desktop. (Participants who handled the Ping-Pong ball generally picked it up or cupped it on the desktop for the duration of the wheel spin, then disengaged.) The second coder scored a random selection of 9 out of the 17 sessions independently for inter-rater reliability assessment. Agreement for number of contacts with the Ping-Pong ball during the participant's turns was 98%, and 100% agreement for contact during the opponent's turns. Agreement was 100% for contact with objects not central to the game of chance (i.e., the clipboard, pencil and elastic band) during both the participant's and the opponent's turns.

Gender pairing. Preliminary one-way ANOVAs were conducted on the dependent measures to detect effects due to dyad gender composition. No effect of gender pairing was found on any dependent measure, and this variable will not be discussed further, all $F_s < 1$.

Contact with the Ping-Pong ball. Contact with the Ping-Pong ball was analyzed by means of within-subjects ANOVAs (participant's turn vs. opponent's turn). Consistent with our expectations, participants handled their numbered ball during their turns more often than during their opponents' turns ($M = 2.56$ versus $M = 1.53$), $F(1, 33) = 25.31$, $p < .001$. No participant touched the elastic or the clipboard. Although the pencil was touched (typically tapping in on the desktop), there was no difference between own ($M = 2.38$) and other turns ($M = 2.53$), $F(1, 33) = .858$, $p = .361$. These results show that during games of chance there is an increased desire to handle objects that are central to the game at the time when the deployment of luck is most relevant, i.e., during one's own wheel-of-fortune spin. Interestingly, there was a significant decreasing linear trend for participants' contact with the Ping-Pong ball while it was their turn across the 5 trials ($T_1 = .794$ versus $T_2 = .588$ versus $T_3 = .471$ versus $T_4 = .353$ versus $T_5 = .353$), $F(1, 33) = 28.3$, $p < .001$. No significant linear trend of touching the Ping-Pong ball was

found during their opponents' spins ($T_1 = .382$ versus $T_2 = .294$ versus $T_3 = .353$ versus $T_4 = .294$ versus $T_5 = .206$), $F(1, 33) = 1.81$, *ns*.

Perceptions of luck. Participants who won the trial set (that is, half the participants), and who were entered into the \$50 draw, scored significantly higher on the Belief in Good Luck scale ($M = 45.59$) than did those who lost ($M = 30.59$), $F(1,32) = 31.09$, $p < .001$. Winning participants also perceived themselves to be luckier types of people ($M = 3.76$ versus $M = 2.00$), $F(1, 48) = 22.86$, $p < .001$, expressed a greater belief that luck is a quality of the persons ($M = 3.94$ versus $M = 2.82$), $F(1, 48) = 4.39$, $p < .05$, and thought themselves better able to act in ways that would influence the outcome of a chance event ($M = 4.65$ versus $M = 2.71$) than did those who lost, $F(1, 32) = 17.25$, $p < .001$.

Discussion

The results of Study 2 confirmed the prediction that people would touch an object central to a game of chance when the use of luck was most relevant. Participants touched the numbered Ping-Pong ball more often when it was their turn as opposed to their opponent's turn. The fact that participants did not also handle the other objects more during their own than their opponents' trials indicates that a general increase in activity (e.g., due to anticipation or anxiety) during own trials was not responsible for our main finding. Why did participants progressively handle their talismanic object less over their own trials? Perhaps it was because their *mojo* demonstrably was not working. Of the thirty-four participants, only two won on the first trial and just two again won on the second trial. Thus, for nearly all participants, an effort to control the game of chance through the application of sympathetic magic resoundingly failed and failed early in the sequence of trials. From this perspective, it is not surprising that participants' contact with their Ping-Pong ball waned as the trials progressed. Note that this diminution of contact did

not occur during the other person's trials or for the other objects. Our results are also consistent with our hypothesis that winning the competitive element of the game (i.e., matching the wheel-of-fortune spin more often than one's co-player) would promote perceptions of luck as a personal possession. Compared to the losing participants, winning participants believed themselves to be personally luckier.

The laws of sympathetic magic account well for our results. Participants appear to have tried to influence the outcome of the wheel-of-fortune spin by making contact with the Ping Pong balls. According to our sympathetic magic analysis, this behavior occurred because of the shared feature, the number, of the ball held by the participant and the target ball they hoped would win on the wheel-of-fortune. Thus, it is possible that through a combination of the law of similarity and the law of contagion (transfer of personal luck to their ball via touch), participants believed that they were able to influence the outcomes of the wheel-of-fortune spins. Study 3 further examined the role of sympathetic magic in the deployment of self-perceived luck.

Study 3: The Transfer of Personal Luck through Sympathetic Magic

The purpose of Study 3 was to assess the impact of opportunities for the deployment of luck through contagion and similarity on perceived likelihood of winning a game of chance and on perceptions of luck as a personal quality. If our interpretation of Study 2 is correct, then people who make direct physical contact with their numbered Ping-Pong ball should have higher expectations that they will win a wheel-of-fortune spin. Likewise, because this form of contagion provides a hypothetical route through which luck can be deployed, participants' self-perceptions of luck as a personal quality should also be heightened as we saw in Study 1. We also tested whether physical contact was necessary, or whether visual contact was also sufficient to invoke the law of contagion. The colloquial phrase "I laid eyes on it first" is used to assert ownership,

and suggests that merely seeing something establishes a connection between viewer and object. If so, merely “laying eyes” on the Ping-Pong ball might be sufficient to engage the sympathetic law of contagion and the related process described by the law of similarity during a wheel-of-fortune spin. We included a condition in Study 3 to test this possibility.

Study 3: Method

Participants and Design

Sixty male and female undergraduates participated for partial credit toward a course requirement. The study was a three-condition between-participants design in which contact with a numbered Ping-Pong ball was manipulated during the spin of a wheel-of-fortune (physical contact vs. visual contact vs. no-contact).

Procedure

Individual participants learned that the research supposedly concerned gambling knowledge and then completed the supporting survey used in the previous studies. The participant was then taken to a room containing the wheel-of-fortune used in Study 2. A digital stopwatch mounted on the back frame of the wheel was visible to the experimenter but not to the participant. The wheel was positioned at the front of the room beside a freestanding easel. Attached to the easel were two large sheets of paper. Two 7-point scaled questions were printed on the second sheet. The first question read “I believe my chances of winning are,” anchored at (1) very bad and (7) very good. The second question read “I can make [this] chance event come out the way I want,” anchored at (1) strongly disagree and (7) strongly agree. The first sheet of paper was used to cover the second until it was time for the participants to answer the questions. On a separate table, on the opposite side of the room from the wheel and easel, 8 Ping-Pong balls, numbered 1 through 8, were on display. Directly behind the Ping-Pong balls was an open

envelope that partially revealed several five-dollar bills. Participants were told that they would select a numbered Ping-Pong ball and that they would win five dollars if the wheel-of-fortune stopped on the corresponding number.

Each participant then was allowed to choose a numbered ball, and was asked to stand at a taped line on the floor 1.5 meters in front of the wheel and easel. If the participant was in either the physical or visual contact conditions, (s)he was asked to bring his or her numbered Ping-Pong ball to the line. If in the physical contact condition, the participant was asked to hold the ball through the duration of the wheel spin. In the visual contact condition a 1.5 meter high x 2 cm diameter tubular post was located directly in front of the taped line. Participants in this condition were asked to place the ball on a small depression at the top of the post so that the number on the ball pointed towards them. By doing so, the ball was one foot in front of the participant and well within his or her view. In the no-contact condition, the participant was told to leave the Ping-Pong ball behind on the table away from the other numbered balls.

We obtained our measures during the spin of the wheel-of-fortune. Each spin was 60 s, plus or minus 5 s in duration. At the 30 s mark (timed by the stopwatch on the wheel), the experimenter revealed the two questions on the easel. The participant was asked to read the first question and orally inform the experimenter of his or her answer. The experimenter then placed piece of removable adhesive-backed paper with an arrow stamped on it under the corresponding number. This procedure then was repeated for the second question.

In order to maintain the cover story through the collection of a final measure and the suspiciousness assessment, those participants who had chosen a number that corresponded to the number the wheel stopped on were given a five dollar bill. Participants whose number did not win were told that they would receive no money. Participants were then asked how frequently

they gambled, and were probed for suspiciousness. Participants were then debriefed, and those who had lost the wheel-of-fortune spin were given five dollars.

Results and Discussion

Gender effects. One-way ANOVAs for gender were conducted on the dependent measures. Effects for all dependent measures were nonsignificant, all $F_s < 1$.

Treatment effects. ANOVA on perceived chance of winning (see Figure 1) yielded the expected significant effect, $F(2, 42) = 14.58, p < .001$. Tukey's post hoc comparisons revealed that participants in the physical ($M = 3.93$) and visual contact ($M = 3.27$) conditions believed their chances of winning to be higher than did those in the no-contact condition ($M = 1.93$), $p_s < .05$. The difference for perceived chance of winning between the physical and visual contact conditions was nonsignificant. The opportunity for contagion through physical contact, by holding the ball, enhanced expectations of winning the wheel-of-fortune spin. Merely making visual contact with the ball was sufficient to affect people's estimates of their chances of winning, as we predicted on the basis of the laws of sympathetic magic. Note again, as in Study 1, that the highest confidence level (in the physical contact condition) is only around the midpoint of the scale.

An ANOVA on participants' beliefs about their ability to influence chance events (see Figure 1) yielded a significant effect, $F(2, 42) = 15.18, p < .001$. Tukey's post hoc test revealed that participants in the physical contact ($M = 4.33$) and visual contact ($M = 3.40$) conditions rated themselves better able to influence random events than did those in the no-contact condition ($M = 2.07$), $p_s < .05$. Our hypothesis was that having a vector through which personal luck could be deployed according to the laws of sympathetic magic would heighten participants' perceptions of personal luck. Indeed, when we provided either physical or visual contact, and

hence the opportunity for contagion, beliefs in an ability to influence chance events were enhanced. Paralleling the findings for expectations of winning, the difference between the physical and visual contact conditions for perceived ability to control the uncontrollable was nonsignificant.

Test of Mediation. Using Baron and Kenny's (1986) test for mediation, a series of regression equations were estimated in a fashion similar to that described and conducted in Study 1. In the first regression equation, type of contact (the independent variable) had an effect on perceived ability to influence chance events (the mediator), $t(43) = 5.53, p < .001$. Type of contact also affected perceived chance of winning (the dependent variable) in the second equation, $t(43) = 5.30, p < .001$. In the third equation, perceived ability to influence chance events affected perceived chance of winning, $t(43) = 4.50, p < .001$. Lastly, the effect of type of contact on perceived chance of winning was less in the third equation, $t(48) = 1.98, p > .05$, than in the second equation, $t(43) = 5.30, p < .001$. Similar to Study 1, perfect mediation was demonstrated by personal luck.

General Discussion

Our general hypothesis is that people sometimes act as if luck is a personal quality that can be intentionally deployed for their benefit in games of chance. Our conceptual starting point is Langer's (1975) prediction that people will prefer to choose (versus not to choose) an alternative in a truly chance situation, although choice is rationally unrelated to the outcome. Our account then focuses on the unconventional quality of self-perceived personal luck as it affects people's reactions to pure games of chance. According to Langer's (1975) illusory control model, inflated estimates of success in chance situations occur because people misunderstand truly chance situations to be controllable through the application of conventional abilities. Our

personal luck account elaborates this model by proposing that people believe they possess an unconventional skill, luck, that they believe can be used to influence the outcome of chance events given an opportunity to do so. This belief becomes inflated, supporting the illusion of control, when people can make choices relevant to a chance event and hence to the deployment of luck. The results of Study 1 showed an illusory control effect on estimated likelihood of winning a lottery, albeit a relative effect. As we predicted, perceived personal luck was relatively higher for participants who chose their lottery ticket than for participants whose ticket was chosen for them.

Results from Studies 2 and 3 provide evidence for the deployment of luck consistent with the laws of sympathetic magic. In Study 2, participants were more likely to touch an object related to a random event in progress (a spinning wheel-of-fortune) when that event was valued (during participants' own turns) than when not (during the other participants' turns). In Study 3, participants who had physical or visual contact with the object during a wheel-of-fortune spin rated their chance of winning as higher than did those in the no-contact condition. Our personal luck account of illusory control predicted these results because it suggests that people act as if they possess the quality of luck and as if that quality follows the laws of sympathetic magic.

Any perception or behavior that negates linear logic or the laws of nature may be deemed as reflecting beliefs consistent with the laws of sympathetic magic (Nemeroff & Rozin, 2000; Rozin & Nemeroff, 1990). As our studies demonstrated, when people are engaged in pure games of chance, linear cause-effect logic is replaced with this less rationally constrained form of thought and behavior. It would seem that the conditions of uncertainty inherent in games of pure chance (i.e., the lack of control over outcomes), provide fertile grounds for thoughts and behaviors consistent with the principles of sympathetic magic. Further, the use of sympathetic

magic may occur in the service of illusory control. Conditions that permit the putative use of sympathetic magic, such as the physical contact condition in Study 3, inflate the participants' perceived chance of winning and perceived ability to control the outcomes of chance events. Our studies suggest that illusory perceptions of control may be attained in games of chance by experiences that are consistent with the transfer of personal luck onto an object central to the game by way of sympathetic magic.

The personal luck account helps expand our understanding of other illusory control findings in the literature. For example, in Langer and Roth (1975), participants were led to believe that they had won a disproportionate number of coin tosses either early or late in a sequence of tosses. Langer and Roth (1975) predicted that participants in the early-win condition, compared to those in the late-win condition would (1) believe themselves to be better at predicting coin-toss outcomes, (2) expect to become better at guessing the outcomes after practice, and (3) expect to win more frequently if another 100 coin tosses were conducted. Langer and Roth's results supported Prediction 1 and Prediction 3, but not Prediction 2. The second prediction rested on the assumption that people expect practice to increase their chances of success, because ordinary skills improve via practice. If our understanding of illusory control is expanded to include perceived personal luck, Langer and Roth's unexpected null finding can be explained. We understand Prediction 2 as referring to focused training on identifiable a skills rather than simple repetition (the focus of Prediction 1 and 3). Thus, when an elite sprinter practices, she does so to hone specific skills (e.g., breathing, form, etc.) that are under conscious and deliberate control. With personal luck, on the other hand, there are no specific activities that can be similarly honed in order to better ones chances at winning during a games of chance. One deploys whatever amount of personal luck one believes (s)he has. That is not to say that

situational factors do not affect one's self-perceived personal luck. For example, changes in self-perceived personal luck could result from experience with actual and nearly experienced outcomes (e.g., Langer and Roth, 1975; Wohl & Enzle, XXXX) or through contagion (e.g., a person might attempt to improve her luck by touching a lucky object such as a four-leaf clover or rabbit's foot).

Conclusions and Caveats

Our personal luck account is a useful elaboration of illusory control as it applies to games of pure chance. We have shown that the unconventional self-perceived skill of personal luck is implicated in the development of illusory control for such games. Our research also makes a hitherto unexamined connection between illusory control and beliefs in sympathetic magic. That is, people seem to act as though they can influence chance events with personal luck through contact with objects having no rational causal connection to the outcomes of their gambles.

Our research leaves questions of generalizability unanswered. The stakes in our games of chance were relatively low. Participants did not gamble with money in their possession before arriving at the laboratory, and the amount was small. Would a greater stake in the outcome of gambling affect the development of illusory control? One possibility is that greater stakes would enhance the need for personal control and thus heighten perceptions of personal luck and the resultant strength of illusory control perceptions. Similarly, individual differences in gambling propensities such as frequency and experience might affect the processes and behaviors we examined. We do not know, for example, whether high frequency, experienced, gamblers are more or less prone to reliance on beliefs in personal luck and sympathetic magic. On the one hand, such gamblers could be highly tuned to the rational probabilities of pure games of chance. On the other, they might have developed highly articulated belief frameworks in luck and magic

that support their persistence in playing games of pure chance. The answers to these questions will illuminate not only illusory control phenomena but gambling behavior as well.

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Figure Captions

Figure 1. Perceived chance of winning and ability to influence chance events in Study 3.

