J Gambl Stud
DOI 10.1007/s10899-015-9520-7

ORIGINAL PAPER

The Overestimation Phenomenon in a Skill-Based Gaming Context: The Case of March Madness Pools

Dae Hee Kwak

Abstract Over 100 million people are estimated to take part in the NCAA Men's Basketball Tournament Championship bracket contests. However, relatively little is known about consumer behavior in skill-based gaming situations (e.g., sports betting). In two studies, we investigated the overestimation phenomenon in the "March Madness" context. In Study 1 (N = 81), we found that individuals who were allowed to make their own predictions were significantly more optimistic about their performance than individuals who did not make their own selections. In Study 2 (N = 197), all subjects participated in a mock competitive bracket pool. In line with the illusion of control theory, results showed that higher self-ratings of probability of winning significantly increased maximum willingness to wager but did not improve actual performance. Lastly, perceptions of high probability of winning significantly contributed to consumers' enjoyment and willingness to participate in a bracket pool in the future.

Keywords Uncertainty · Skill-based gaming · Illusion of control · Enjoyment · Risk-taking

Introduction

Making predictions a priori about as many game winners as possible in the National Collegiate Athletic Association's (NCAA) Men's Basketball Tournament (a.k.a. *March Madness*) has become one of the most popular betting activities in homes, offices, and schools in the United States (McCrea and Hirt 2009). The March Madness tournament is the most widespread wagered-on sporting event in the U.S. (Linn 2013). Over 100 million people are estimated to take part in tournament bracket contests, which accounts for one-third of the U.S. population (Jessop 2014). In addition, more than $12 billion is wagered in

D. H. Kwak (✉)
University of Michigan, 1402 Washington Heights #2118, Ann Arbor, MI 48109, USA
e-mail: kwakd@umich.edu

Published online: 11 January 2015

legal and illegal "pools" on the tournament (McCarthy 2012), suggesting that the March Madness tournament exceeds the $10 billion amount bet on the National Football League's Super Bowl, considered the biggest single betting day in sports (Jessop 2014). Illegal betting on the men's college basketball tournament is so widespread that only one percent of the amount wagered on the tournament comes from the state of Nevada (Jessop 2014), one of four states in the U.S. where sports gambling is legal. This further illustrates the sheer magnitude of the number of people engaging in collegiate sports wagers during March. Given the popularity of the tournament, numbers of advertisers are keying on it to reach a diverse audience. According to *Ad Week* (Crupi 2011), March Madness is the second biggest postseason sports showcase for advertisers, surpassing the Major League Baseball playoffs and World Series, the National Basketball Association playoffs and Championship Series, and all 35 college football bowl games. Now that all games are available live on mobile devices and personal computers, marketers are jumping on the "bracket" bandwagon to tie in their brands with the excitement of making predictions about the tournament.

In a typical March Madness pool, consumers predict the outcome of all 63 tournament games and gain points based on the number of correct predictions. More sophisticated pools award higher points for correct predictions in later rounds of the tournament. Prizes (e.g., entry fees from participants) are then usually awarded to the player with the highest point total. While the tournament draws millions of American consumers to place bets, it is almost impossible to make perfect predictions for 68 games being played during the three-week tournament. A person with modest knowledge about team rakings and other information has about a one in 128 billion chance of correctly picking each of the 63 games in the tournament (Linn 2013). This chance is far below that of purchasing a winning lottery ticket. Even the highest scoring bracket among ESPN.com subscribers has still gotten 18 games wrong, suggesting that it is extremely difficult to make accurate predictions. If making accurate predictions is notoriously difficult, then, what makes March Madness pools so popular? More importantly, what drives people to overestimate their control over the outcome when the known statistical probability of making all predictions correctly is close to zero? Does so-called skill really matter in making more accurate predictions? As such, consumer behavior in uncertain contexts remains underexplored in the marketing literature (Lam 2007; Sierra and Hyman 2009). The present study attempts to find answers to these questions.

One could argue that the allure of the tournament is that it is very difficult so that anyone without basketball knowledge can have a chance to outperform knowledgeable or so called "skilled" participants. Therefore, we contend that it is not the actual statistical probability that matters, but individuals' *perceived* probability of winning that does. Previous research has documented that individuals with higher perceived control tend to invest more time and money to achieve the desired outcome (e.g., Chau and Phillips 1995; Kwak et al. 2010). Illusion of control theory (Langer 1975) suggests that skill-relevant factors (e.g., involvement, choice, prior knowledge, competition, etc.) increase individuals' control beliefs (see Thompson et al. 1998, for a review). In March Madness pools, personal selections (i.e., filling out a bracket) coupled with uncertainty of outcome might increase perceptions of control and increase individuals' beliefs that they have a better chance of making correct predictions. While previous research has considered illusion of control as erroneous cognition that is frequently associated with problem or pathological gamblers (e.g., Ladouceur 2004; Moore and Ohtsuka 1999), research has been equivocal about whether such inflated control beliefs indeed result in better performance (e.g., Andersson et al. 2005; Cantinotti et al. 2004). In particular, research has been sparse in examining the

overestimation phenomenon among casual or social gamblers in a skill-based gaming context.

To elucidate the overestimation phenomenon in a skill-based gaming context, we report on empirical findings regarding how consumers develop inflated winning expectancy in predicting the outcomes of the NCAA men's basketball tournament brackets. In addition, we examine whether enhanced winning confidence increases financial risk-taking and actual performance. Finally, we explore the role of illusion of control in predicting enjoyment and willingness to participating in a future tournament bracket.

Background and Review

Overestimation of Control in Chance-Based Events

People often overestimate their control over the desired outcome in chance-based situations. This is known as the illusion of control, which is defined as "an expectancy of a personal success probability inappropriately higher than the objective probability would warrant" (Langer 1975; p. 313). The evidence of illusory control has been extensively documented in various chance-based gaming contexts where outcomes are unrelated to the actions of the participants—such as lotteries (e.g., Ladouceur and Sévigny 2005; Langer 1975; Rogers 1998), slot machines (e.g., Griffiths 1995), and dice-throwing (e.g., Dunn and Wilson 1990).

The notion of illusion of control has also been explored in other gaming contexts believed to be associated more with participants' skill/knowledge than chance, including horse-racing (e.g., Allcock 1987; Ladouceur et al. 1998), sports betting (e.g., Cantinotti et al. 2004), and fantasy sports (e.g., Kwak et al. 2010, 2013). Research has consistently shown that illusion of control is closely related to financial risk-taking (e.g., Chau and Phillips 1995; Kwak et al. 2010), gaming frequency (e.g., Kwak et al. 2010), and gambling behaviors (e.g., Kwak et al. 2013; Moore and Ohtsuka 1999). Given the widespread overestimation phenomena in various gambling situations, researchers have explored antecedents that influence illusion of control. Studies have found that people develop illusory control perceptions when skill-relevant factors (e.g., familiarity, knowledge, choice, etc.) are presented with the task (Thompson et al. 1998). For instance, if individuals are more familiar with a task (via practice or simply imagining the task), they develop illusions of control (Ayeroff and Abelson 1976; Dykstra and Dollinger 1990).

Choice is another skill-related factor that increases illusion of control. When participants were allowed to make their own choices such as selecting lottery numbers, as opposed to being given numbers randomly by the experimenter, they believed their personal choices had a better chance of winning (Langer 1975). In the March Madness tournament bracket context, completing one's own bracket would amplify the belief that one's prediction is more accurate than picks made by other contestants. Why would making personal selections increase optimistic biases regarding future events? The desire to control events in one's life seems to be closely tied to this erroneous cognitive processing. Psychologists have proposed theories around a notion of "control motivation." Similarly, DeCharms (1968) asserted that the individual's primary motivational disposition is to become a causal agent for his or her environment. In addition, Kelley (1971) contended that cognitive biases in our expectations are in part due to individuals' strong desire for control. Likewise, individuals possess such innate desire for control and attribute themselves as causal agents of desirable outcomes. In an empirical study, Burger and

Cooper (1979) found that desire for control is positively associated with illusion of control. Langer (1975) also found that people overestimate their control over desirable outcomes when they are personally involved in the selection process. For instance, when people select lottery numbers on their own, they tend to overestimate the value of their selection over randomly selected numbers, while the probability of winning a lottery ticket remains unchanged. Likewise, we posit that the act of the selection process is what increases individuals' estimation of their chances in uncertain contexts. Consistent with the existing literature, we expect that individuals filling out their own brackets would likely to be more optimistic about their performance than those who did not make their own selections.

In addition, previous research suggests that knowledge or experience increases illusion of control (e.g., Cantinotti et al. 2004; Kwak et al. 2010; Langer 1975). For instance, Cantinotti et al. found that experts' skills do not translate into better financial gains than random selection, concluding that experts' skills are cognitive distortions that reinforce illusion of control. Considering the wealth of statistical information and analysis available to consumers, sports betting provides a unique opportunity to explore the role of knowledge/skill in the development of illusion of control. It seems plausible that individuals' perceived knowledge about sport would build confidence in their predictions. Kwak et al. (2010) found that perceived knowledge about sport is a significant driver of confidence among fantasy sports participants. However, one important question that remains to be answered is whether confidence about winning leads to better performance in reality. If confidence actually leads to better performance, the notion of 'illusion' should be avoided in discussing the phenomenon.

Perceived Skill and Accuracy in Predictions

In the gambling literature, there remain mixed findings about whether participants' experience or so called "skills" actually produce better performance in sports betting. One could argue that knowledge or experience indeed help gamblers perform better than choosing at random. Recently, d'Astous and Gaspero (2013) found that online sports bettors' return on investment (ROI) was positively associated with their experience and the degree of information search and analysis they conducted. Their findings indicate that skill-based factors such as experience or extensive information search can actually enable bettors to achieve better (financial) outcomes, which counters previous findings (cf. Cantinotti et al. 2004). Similarly, Forrest and Simmons (2002) found that sports experts made more accurate predictions of the result of a set of soccer matches than the predictions made by a random system. The results suggest that experts' knowledge and experience help in making better predictions. In another study, Andersson et al. (2005) examined the predictions of five groups of people with different levels of expertise in soccer. Participants predicted the outcome of the 2002 FIFA World Cup soccer tournament, and five groups outperformed the completely random model. However, the group with most knowledge did not perform better than the group having the least knowledge in soccer. The experts overestimated their performance and tended to be more overconfident than their counterparts with less knowledge. The researchers also manipulated participants' access to domain-relevant information and found that providing non-experts with information did not improve their performance, but increased their confidence. Their findings highlight that overconfidence does not translate into better performance. Therefore, the current study aims to extend the literature by examining whether confidence leads to better performance in another popular skill-based gaming context—the *March Madness* bracket.

In our study, we propose that personal selections will amplify individuals' confidence when participating in a competitive pool. We also propose that such inflated confidence is directly linked to enjoyment, which is found to be a primary reason people engage in gambling behavior (e.g., Gupta and Derevensky 1998; Nower and Blaszczynski 2010). Considering that enjoyment is a critical motivating factor, the more an individual believes he or she has a better chance of winning, the more likely the person will find the game to be entertaining.

Overview of Studies and Summary of Predictions

As discussed previously, both skill and luck play a role in predicting the outcome of a sporting event. Given that making an accurate prediction is not driven by either purely luck or skill per se, we contend that skill-relevant factors (e.g., personal selection and domain-specific knowledge) will increase consumers' confidence about winning. Two studies are presented here to explore the overestimation phenomenon in a popular sports betting context (i.e., March Madness pools). Study 1 examines the notion that the personal selection process increases the illusion of control (Langer 1975). In the case of March Madness bracket pools, we expect that individuals allowed to make their own picks will report a greater probability of winning than individuals who did not make any selections, after controlling for their previous bracket experiences and perceived knowledge about sport (i.e., college basketball). As previously discussed, we hypothesize that the personal selection process coupled with the innate desire for control would amplify one's belief that his or her selection will lead to the desirable outcome (Burger and Cooper 1979; Kelley 1971).

Hypothesis1 Making personal selections will increase individuals' projection of their probabilities of winning.

After establishing that the personal selection procedure increases one's expectations of winning, Study 2 sought to investigate the predictive role of expectations of winning on various cognitive and behavioral outcomes. For instance, study 2 was designed to examine: (1) the impact of confidence on maximum willingness to wager, (2) the relationship between confidence and actual performance, and (3) the role of confidence in predicting consumer enjoyment and willingness to participate in a bracket pool in the future. In line with previous research on illusion of control and gambling behavior, we expect that more confident individuals will wager more money than less confident individuals (Chau and Phillips 1995). Chau and Phillips (1995) found that bettors tend to use minimal computational effort when placing bets, suggesting that subjective confidence would serve as a cue that affects their wagering. To examine the relationship between confidence and actual performance, we calculated each participant's actual bracket score at the end of the tournament. Given the difficult nature of achieving a better score through making deliberate choices than through random selections (McCrea and Hirt 2009), we expect that confidence will not necessarily increase accuracy in predictions. Therefore, we propose the following hypotheses.

Hypothesis 2 Individuals with high confidence in winning will intend to wager more money than individuals with low confidence.

Hypothesis 3 Confidence will not improve actual performance.

We also posit that inflated winning confidence is an important driver of consumer enjoyment of participating in a bracket and willingness to play a bracket pool again. Previous research has suggested that overconfidence is closely associated with positive feelings such as enjoyment and arousal (e.g. Dunn and Wilson 1990; Kwak et al. 2010). In addition, social cognitive theories of achievement and motivation suggest that task enjoyment is a critical factor that facilitates intrinsic motivation (Elliot and Harackiewicz 1994; Puca and Schmalt 1999). As such, we posit that task enjoyment will enhance intrinsic motivation, which will motivate consumers to participate in a similar contest in the future. Based on a review of the literature, we advance the following hypotheses.

Hypothesis 4 Confidence in winning will have a positive effect on task enjoyment.

Hypothesis 5 Task enjoyment will have a direct effect on willingness to play again.

Hypothesis 6 The effect of confidence on willingness to play again will be mediated by task enjoyment.

Study 1

Study 1 is designed to examine the impact of making personal selections on the development of illusion of control. We compared individuals' winning probability in two groups: a group of participants given the opportunity to fill out their own brackets and a group not given that opportunity.

Participants and Procedures

A total of 81 undergraduate students (56.8 % female) at a large Midwestern university in the United States participated in this study. Subjects received course credit for participating in this study. The majority of respondents were Caucasians (85.2 %) and the mean age of the sample was 19.5 ($SD = 1.06$). Data collection started one day after the 2012 March Madness tournament bracket was released to the public and ended before the beginning of the first round. This was to control for potential confounding from the results of early rounds. Each participant who agreed to participate in the study was told that he or she would be one of approximately 100 subjects competing in the pool. They were then randomly assigned to one of two conditions—personal selection condition and control condition. In the personal selection condition, participants were given the official printable bracket sheet available from NCAA.com and were instructed to make their own predictions for all 63 games. After completing their brackets, they responded to questionnaires asking about their perceived probability in winning. In the control condition, participants were given the blank official bracket sheet but were not told to make any predictions. After viewing the bracket of the tournament, they were asked to respond to questionnaires projecting their winning probabilities if they completed the bracket. Therefore, the only difference between the two groups was the presence/absence of the personal selection process. In both conditions, participants were also asked about their past bracket behaviors and perceived knowledge about men's college basketball. These measures were utilized as control variables since these skill-relevant factors (e.g., foreknowledge, familiarity, past behavior) have been found to increase illusion of control (Thompson et al. 1998). In addition, these measures were used to ensure that participants in the two conditions did not differ in terms of past bracket behaviors and perceived knowledge about college basketball.

Measures

Perceived Probability of Winning

The illusion of control has been operationalized in different ways in the literature (see Presson and Benassi 1996, for a review). For instance, studies have used various measures such as using discrepancy scores between expected and actual performance, self-ratings of perceived control, and self-ratings of confidence in winning. Presson and Benassi (1996) found that larger effect sizes were reported in studies that measured participants' perceived ability to predict outcomes than participants' perceived ability to control outcomes. Therefore, we employ self-ratings of perceptions of likelihood of winning to assess individuals' illusion of control in bracket participation. A single item was used to directly measure respondents' perceived probability of winning ("How would you estimate your chance (from 0 to 100 %) to become one of the top ten percent of scorers in this challenge?"). Participants rated their winning probability using numerical values.

Past Bracket Behaviors

Two items were used to measure individuals' past bracket behaviors. The first item asked how often they participate in March Madness pools on a five-point scale (1 = never; 2 = rarely; 3 = sometimes; 4 = frequently; 5 = every year). The second item asked the average number of different brackets they fill out every year on a five point scale (1 = none; 2 = one bracket; 3 = two brackets; 4 = three brackets; 5 = four brackets or more).

Perceived Basketball Knowledge

Three-items were adapted from Kwak et al. (2010) to measure participants' knowledge about college basketball ("I am knowledgeable about college basketball compared with the average basketball fan," "I am confident in using college basketball knowledge compared with the average basketball fan," and "I have better ability to comprehend college basketball information compared with the average basketball fan"). The measures used a seven-point Likert-type scale (1 = strongly disagree; 7 = strongly agree) and were internally consistent ($\alpha = .97$).

Results and Discussion

Table 1 illustrates the sample description and mean differences of control variables (past bracket behaviors, perceived basketball knowledge) across conditions. F ratios indicated that there were no significant differences in past bracket behaviors and perceived knowledge across groups. However, age was significantly different across groups [$F(1, 81) = 17.64$, $p < .001$] and was thus included as a covariate in hypothesis testing.

In order to test the research hypothesis, analysis of covariance (ANCOVA) was conducted by employing age, past bracket behaviors, and perceived basketball knowledge as covariates. Levene's test of equality of variance was nonsignificant ($p > .26$), indicating that the assumption of homogeneity of variance was met for this sample. ANCOVA results showed significant main effects of personal selection [$F(1, 81) = 4.74$, $p < .05$, $\eta^2 = .06$]. Among covariates, only perceived knowledge [$F(1, 81) = 18.53$, $p < .001$, $\eta^2 = .20$] was significant. Frequency of participating in brackets [$F(1, 81) = 2.11$, $p = .15$], number of

Table 1 Description of participants, past bracket behaviors, and perceived knowledge across conditions (Study 1)

Variables	Experimental condition (N = 41)	Control condition (N = 40)
Gender	Female (56.1 %)	Female (57.5 %)
Age	19.93 (*SD* = .88)	19.03 (*SD* = 1.05)
Past bracket behavior		
Frequency	3.34 (*SD* = 1.46)	3.13 (*SD* = 1.57)
Number of brackets	2.61 (*SD* = 1.18)	2.43 (*SD* = 1.34)
Perceived basketball knowledge	3.95 (*SD* = 1.67)	3.63 (*SD* = 1.98)

Mean differences of all past bracket behaviors and perceived basketball knowledge across conditions were not statistically significant ($Fs < .65$, $ps > .42$). Age difference was statistically significant ($F(1, 81) = 17.64$, $p < .01$). Thus, age was included as a covariate in the main analysis

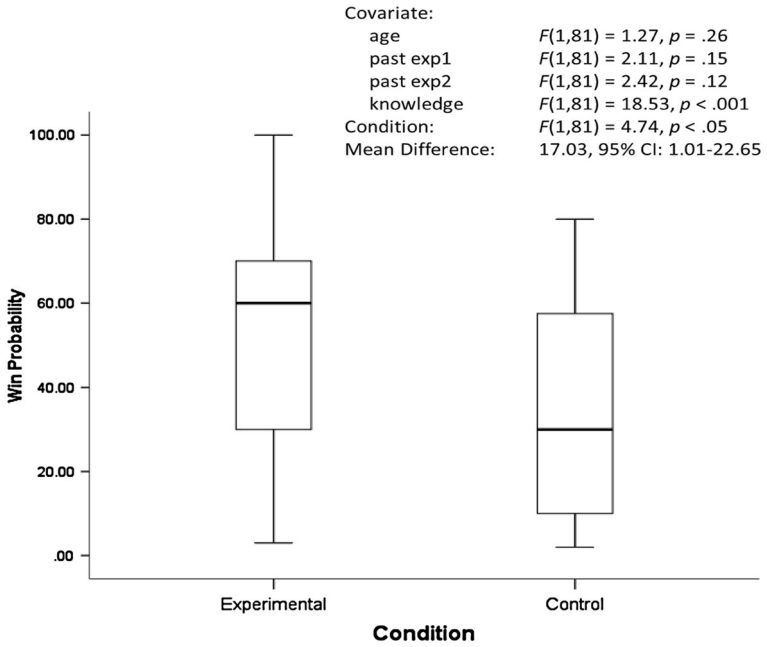


Fig. 1 Box plots relevant to the comparison of the experimental and the control conditions

brackets filled out [$F(1, 81) = 2.42$, $p = .12$], and age [$F(1, 81) = 1.27$, $p = .26$] were not significant. As shown in Fig. 1, participants in the personal selection condition ($M = 51.83$, $SD = 26.24$) felt more confident about their probability of winning than participants in the control condition ($M = 34.80$, $SD = 25.13$). Therefore, Hypothesis1, that making personal selections inflates individuals' expectations of desired outcomes, was supported after controlling for individuals' past bracket behaviors and perceived basketball knowledge.

This finding confirms the notion that personal selection leads to erroneous beliefs about one's choices (Langer 1975). While previous research on illusion of control has tended to

focus on purely chance-based gaming contexts (e.g., lottery, slot machine), our finding contributes to the literature by demonstrating that consumers' personal choice increases illusion of control in a skill-based gaming context as well. We also demonstrate that domain-specific perceptions of knowledge contribute to the development of illusion of control (Kwak et al. 2010; Thompson et al. 1998). Researchers agree with the notion that individuals have innate desires to become causal agents of future outcomes (e.g., Burger and Cooper 1975; deCharms 1968; Kelley 1971). Our findings show that the personal selection procedure augments such expectations. We can speculate that participants felt more confident about the desired outcome because they knew their performance would hinge on the selections they made. In addition, one could also argue that lack of personal involvement in predictions reduced illusion of control which might result in under-confidence for those in the control condition. However, our data suggest that controlling for individuals' past bracket behaviors and perceived domain-specific knowledge, perceived winning projection is positively associated with personal selection.

Study 2

Having demonstrated that making personal selections inflates individuals' confidence, Study 2 was designed to investigate the effects of self-ratings of probability of winning on wager amounts, actual performance, and perceived enjoyment. In Study 2, we created a "March Madness Bracket Challenge" event and invited participants to participate in a real contest. All participants filled out their brackets for the 2011 March Madness tournament, and five participants among the top ten percent of scorers were randomly selected to be rewarded with a gift card ($100 VISA debit card).

Participants and Procedures

Undergraduate and graduate students (N = 197) attending a large Midwestern university were recruited online from various courses in Communications Studies, Movement Science and Sport Management. Forty-six percent of the sample were female and the mean age of the sample was 25.9 ($SD = 4.92$). Eighty-seven percent of the sample reported that they have participated in March Madness pools in the past, and 69 % reported that they have placed bets on the bracket (Avg. wager amount = $19.66, $SD = 19.88$). Data collection started one day after the 2011 March Madness tournament bracket was announced and ended before the beginning of round 64. Each participant who agreed to participate in the study was told that he or she would be one of approximately 200 subjects competing in the pool. Participants were also told that the top 10 % of scorers would be eligible for a random prize drawing of five $100 VISA gift cards (1/40 probability to become one of the prize winners). Participants were told that their brackets would be calculated based on the following scoring system: 2 points for each correct pick in the "Sweet 16"; 4 points for each correct pick in the "Elite 8"; 8 points for each correct pick in the "Final Four"; and 16 points for the correct pick in the "Final" (total eligible points add up to 128). After reading the consent form, participants were given the official printable bracket sheet available from NCAA.com and were instructed to make their predictions starting from the round of 16, the round of 8, the final 4, and the championship game. After completing their brackets, they responded to questionnaires asking about their probability of winning, wager amount, past bracket behavior, perceived basketball knowledge, and perceived enjoyment of the bracket competition. After the tournament was completed, each participant's bracket

performance was calculated based on the scoring system described above. Scores in each round were added up to create a total score for each participant.

Measures

For perceived probability of winning, past bracket behaviors, and perceived basketball knowledge, same measures used in Study 1 were utilized. Mean probability of winning a prize was 46.38 (range 0-100, $SD = 27.62$). The multi-item perceived basketball knowledge scale was internally consistent ($\alpha = .97$). They were asked to freely estimate their chance (from 0 to 100 %) to become eligible for prize (probability range 0-100; Mean = 46.38, $SD = 27.62$).

Maximum Willingness to Wager

A single item was used to directly measure participants' maximum willingness to wager on their own bracket. The item asked respondents "If you had an option to place a bet, what is the maximum amount you would consider wagering on your current bracket?" Participants responded to this questionnaire in dollar amounts (amount range \$0-200; Mean = 15.79, $SD = 17.53$).

Task Enjoyment

Respondents' degree of enjoyment in participating in the March Madness bracket competition was adapted from Kwak et al. (2010). The scale was used to capture the hedonic value of the competition. Participants were asked to rate their overall enjoyment playing in a fantasy football league using a measure consisting of five seven-point semantic differential items (e.g., "I feel the *XXX Bracket Challenge* is *dull-exciting; delightful-not delightful; thrilling-not thrilling; fun-not fun; unenjoyable-enjoyable*"; $\alpha = .89$).

Actual Performance

Each participant's bracket performance was calculated after the completion of the championship game. As previously described, participants' scores were calculated using the following scoring system: 2 points for each correct pick in the "Sweet 16"; 4 points for each correct pick in the "Elite 8"; 8 points for each correct pick in the "Final Four"; 16 points for the correct pick in the "Final." All scores for different rounds were added to create a total bracket score (score range 4-66; Mean = 30.05, $SD = 10.00$).

Willingness to Play Again

Participants' willingness to play a bracket pool again was measured with three seven-point semantic differential items asking about participants' likelihood of participating in the bracket challenge contest next year ("How likely is that you would play the XXX Bracket Challenge again next year?" Improbable-probable; unlikely-likely; impossible-possible; $\alpha = .96$).

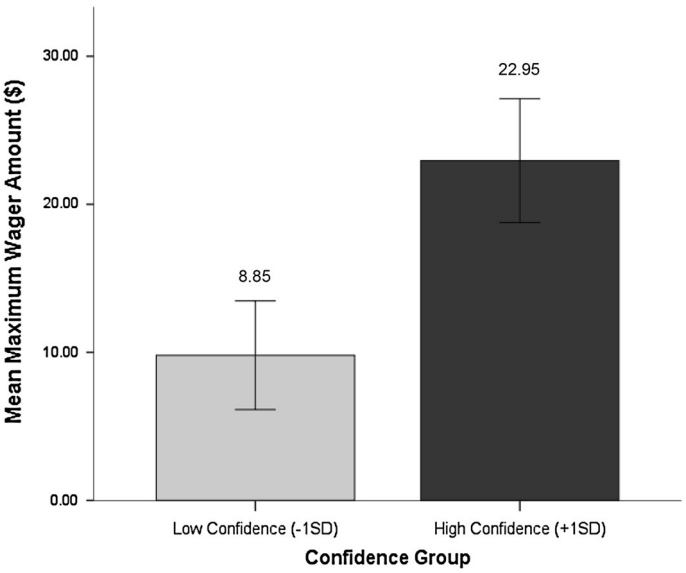
Results and Discussion

Illusion of Control and Wager Amount: H2

We converted perceived probability of winning estimates into standardized scores (z scores; mean = 0, SD = 1) to facilitate comparisons of wager amounts based on participants' perceived chances of winning. Participants with 1 *SD* above and 1 *SD* below the mean perceived chances of winning were grouped into either a high confidence group (1 *SD* above) or a low confidence group (1 *SD* below). Then ANCOVA was conducted to examine whether being in the high confidence group resulted in being willing to wager a greater amount of money than being in the low confidence group, while controlling for past bracket behaviors, gender, and perceived basketball knowledge. ANCOVA results showed a significant main effect of perceived probability of winning [$F(1, 81) = 8.56$, $p < .01$, $\eta^2 = .10$]. Among covariates, only number of brackets completed in the past year [$F(1, 81) = 3.84$, $p < .054$] was marginally significant. All other covariates were nonsignificant ($Fs < 1.10$, $ps > .30$). As shown in Fig. 2, high-confidence individuals reported that they would wager more money ($M = \$22.95$, $SD = 12.91$) than low confidence individuals ($M = \$8.85$, $SD = 10.26$). Therefore, H2 was supported.

Illusion of Control and Actual Performance: H3

Similar to the test for H2, an ANCOVA was utilized to examine whether high confidence individuals demonstrated better performance than low confidence individuals. Participants were grouped into either a high confidence group or low confidence group based on standardized z-scores. Again, gender, past bracket behaviors, and perceived basketball



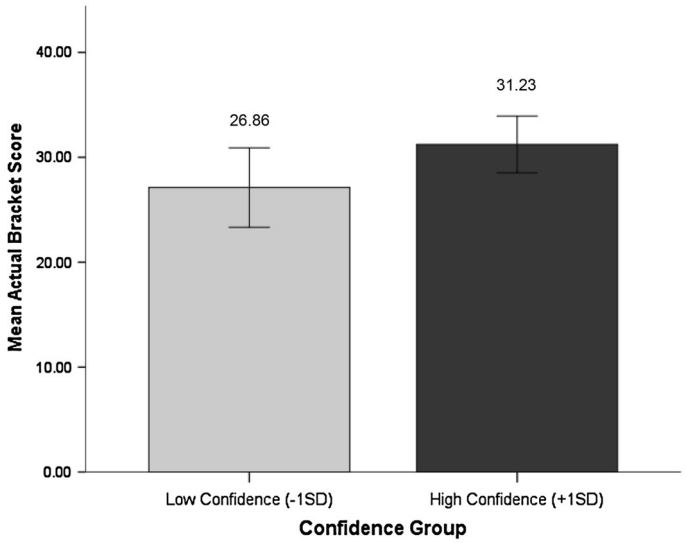
Note. Error bars denote 95% confidence intervals.

Fig. 2 Mean of maximum wager amount as a function of confidence in winning (Study 2). *Error bars* denote 95 % confidence intervals

knowledge were entered as covariates. ANCOVA results indicated no significant effect of perceived chances of winning on actual bracket scores [$F(1, 81) = .38$, $p = .54$]. Among covariates, only past bracket behavior was marginally significant $F(1, 81) = 3.43$, $p = .07$, $\eta^2 = .04$]. Other covariates were statistically nonsignifcant ($Fs < 3.03$, $ps > .09$). As shown in Fig. 3, high confidence individuals' average score ($M = 31.23$, $SD = 8.34$) was not significantly higher than low confidence individuals ($M = 26.86$, $SD = 12.35$). Thus, H3 was supported.

Illusion of Control, Enjoyment, and Willingness to Play Again: H4, H5, and H6

To examine the relationship between illusion of control, enjoyment, and willingness to play again, we employed the Statistical Package for the Social Sciences (SPSS) macro for testing simple mediation effects (Preacher and Hayes 2004). In order to better understand the relationships among other variables, past experience and basketball knowledge variables were included as covariates in the mediation model. Figure 4 shows that perceived probability of winning is positively associated with task enjoyment ($\beta = .44$, $t = 6.04$, $p < .001$) and willingness to play again ($\beta = .38$, $t = 5.77$, $p < .001$). Enjoyment also had a positive impact on willingness to play again ($\beta = .60$, $t = 6.86$, $p < .001$). Among covariates, past experience had a positive impact on willingness to play again ($\beta = .29$, $t = 3.70$, $p < .01$) but basketball knowledge had no significant impact on willingness to play again ($\beta = .01$, $t = .13$, $p = .89$). Therefore, both H4 and H5 were supported. When controlling for covariates and enjoyment, the direct impact of perceived probability of winning on willingness to play again became non-significant ($\beta = .15$, $t = 1.13$, $p = .12$). Furthermore, as hypothesized, perceived probability of winning had an indirect positive effect on willingness to play again mediated by enjoyment ($\beta = .26$). We tested the



Note. Error bars denote 95% confidence intervals.

Fig. 3 Mean actual bracket scores as a function of winning confidence (Study 2). *Error bars* denote 95 % confidence intervals

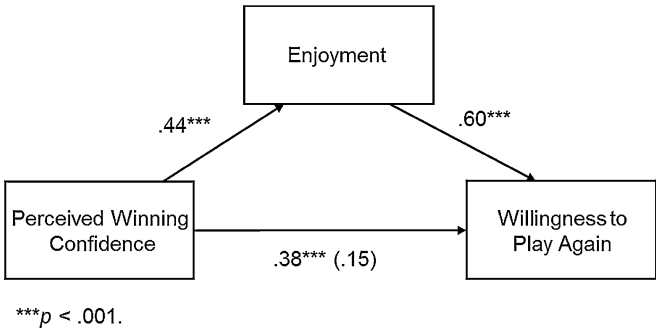


Fig. 4 Standardized regression coefficients for the relationship between perceived confidence in winning and willingness to play again as mediated by task enjoyment (Study 2). The standardized regression coefficient between perceived winning confidence and willingness to play again, controlling for enjoyment and other covariates (past experience and basketball knowledge), is in *parentheses*

significance of this indirect effect using bootstrapping procedures (Preacher and Hayes 2004). Unstandardized indirect effects were computed for each of 1,000 bootstrapped samples, and the 95 % confidence interval was computed. The two-tailed significance test (assuming normal distribution) demonstrated that the indirect effect was significant (Sobel's $z = 4.51$, $p < .001$). This indirect effect was still significant event after controlling for covariates. The 95 % confidence interval ranged from .16 (lower limit) to .40 (upper limit). Therefore, enjoyment mediated the effect of confidence on willingness to play again, in support of H6.

General Discussion

While consumers' engagement in predicting outcomes of uncertain events (e.g., *March Madness, Super Bowl*) has become a popular and widely accepted form of entertainment, relatively little is understood about consumers' gaming behavior (Lam 2007; Sierra and Hyman 2009). In two studies, we demonstrated the existence of illusion of control in the NCAA Men's Basketball Tournament context. Personal selection had a biasing effect of inflating participants' estimation of the likelihood of winning (Study 1), and such perception was indeed "illusory" in that it did not predict actual performance (Study 2). However, more importantly, we showed that such inflated control beliefs were significantly associated with participants' maximum willingness to wager and enjoyment of participating in a competition.

In two studies, we demonstrated the existence and predictive utility of the illusion of control effect, which occurs when personal selections are made, and is significant in predicting maximum willingness to wager, consumer enjoyment, and willingness to play again. Study 1 showed that making personal selections increased confidence in winning. Participants who invested time to make actual predictions about the upcoming tournament were more optimistic about their performance than those who did not make any prediction (see Fig. 1). What psychological mechanisms underlie the increase in probability projection when participants complete their own brackets? In the literature review, we suggested that the control motivation coupled with personal selection increases erroneous beliefs about control over outcomes (e.g., Kelley 1971). As an alternative explanation, cognitive

"effort" involved in making predictions would likely predispose participants to be optimistic about their choices. Given that we only allowed the participants in the experimental condition to make their own selections, we believe this increase in confidence is in part due to overvaluation of their personal effort.

Recently, Norton et al. (2011) proposed the "IKEA effect," which asserts that personal labor increases the valuation of completed tasks. They found that a positive link between effort and perceived value of finished task was evident in both consumers who are interested in "do-it-yourself" projects and those who are relatively uninterested. As such, consumers would overestimate the value of the finished task (bracket) when they are actively engaged in doing the work (selection) process. The authors also contended that the overvaluation of individuals' effort could be more apparent when the task orientation is for pleasure. Considering that participating in a March Madness pool is a hedonic experience, it seems plausible that making predictions in each round might increase one's valuation of his or her own effort. Although their research context is not directly relevant to making decisions under conditions of uncertainty per se, the notion that consumers overvalue their effort in finishing a given task offers a valid potential explanation for this interesting phenomenon. Future studies should examine individuals' perceived effort to establish the link between two judgments—*evaluation of inputs* and *prediction of outcomes* (Kahneman and Tversky 1973).

Given the mixed findings in the sports betting literature (e.g., Andersson et al. 2005; Cantinotti et al. 2004; d'Astous and Gaspero 2013), our findings provide additional empirical evidence that skill-relevant factors in fact do not contribute to actual performance. For instance, we found that domain-specific knowledge and perceived probability of winning did not contribute to actual performance. Our findings confirmed that confidence in winning is indeed overrated and has no relationship to actual performance. However, we found that such inflated confidence in winning was the only significant predictor of consumer enjoyment. Based on our findings, we posit that the illusion of control is a critical motivator that enhances task enjoyment, which has a direct effect on willingness to play again. As such, we show that irrational cognitive processing has utility in predicting consumer enjoyment and willingness to play a tournament bracket pool again in uncertain situations.

Enjoyment is the predominant factor that motivates non-pathological gamblers to engage in gambling behavior (e.g., Gupta and Derevensky 1998). As social gamblers, participants would play March Madness pools to increase their enjoyment of watching the actual event (Mandel and Nowlis 2008; Lin et al. 2012). Our findings suggest that illusion of control was significantly associated with participants' enjoyment of playing a tournament bracket (Kwak et al. 2010). Given that illusion of control is positively associated with enjoyment, more research should be conducted to identify if the enjoyment derived from overconfidence reinforce erroneous perception about one's control over the outcome. More importantly, from a clinical perspective, one would wonder if there is a tipping point that non-pathological gamblers show psychological and behavioral markers of problem gamblers. Obviously, much more research should be conducted to distinguish different gambling patterns and behaviors among non-pathological and pathological gamblers. Recently, Orgaz et al. (2013) found that pathological gamblers demonstrated greater illusions on their daily lives not restricted to gambling than undiagnosed sample. Their findings indicate that pathological gamblers tend to overestimate cause-effect relationships in general than non-pathological gamblers. Future studies should be conducted to explore how filling out the bracket develops illusions of control among pathological- and non-pathological gamblers. Perhaps, the direct link between personal selection and overconfidence would be more

salient among pathological gamblers than non-pathological gamblers. However, the role of domain-specific knowledge and relevant experience would be driving illusion of control for non-pathological gamblers. Likewise, it would be interesting to examine how pathological gamblers and non-pathological gamblers differ on developing illusion of control in skill-based gaming situations.

Limitations and Directions for Future Research

Several limitations should be acknowledged. First, participants were recruited from a Midwestern university and therefore, the results cannot be generalized to a broader audience. Targeting different populations based on previous gambling behaviors would be useful to further extend the current study. For instance, it would be interesting to compare pathological gamblers and non-pathological gamblers on their level of illusion of control in a tournament bracket setting. Second, we used self-report measure when assessing individuals' wager amount if s/he had an opportunity. While such approach might be appropriate in gauging participants' interest in wagering, there could be discrepancies between willingness to wager and actual wagering behavior. Therefore, future studies should address this issue by establishing the validity of self-reported wagering intent (Hodgins and Makarchuk 2003). Although our findings demonstrate that personal selection increased participants' estimation of the likelihood of winning, further research should be conducted to examine mechanism underpinning the overvaluation process. In particular, are there any processing elements that facilitate overvaluation of participants' perceived control in uncertain contexts? For instance, do participants who spend more time (more cognitive effort) on completing the bracket report greater levels of perceived control than those who spend less time, after controlling for their domain-specific knowledge? While we speculate that time spent on completing the bracket would elicit the perception of control, the question of whether confidence in winning is also a direct function of time (effort) spent on filling out the bracket remains to be explored. Therefore, future studies should measure time filling out the bracket or assess individuals' cognitive effort exerted during the selection process to assess the relationship between effort and participants' gaming behavior (Garbarino and Edell 1997).

Our study showed that confidence does not translate into better performance. This finding enabled us to replicate the illusion of control theory in the March Madness context. Previous research suggests that individuals must correctly predict an upset (a win by a higher seeded, unknown team over a lower seeded, favored team) to achieve a higher score in the tournament pools (McCrea and Hirt 2009). Future research could examine whether the number of upsets predicted by an individual can enhance his or her confidence in winning.

In addition, our study did not explicitly measure participants' emotions. In the gambling literature, arousal is closely associated with gambling behavior and is one of the highly sought emotional rewards that gamblers find gratifying (e.g., Neighbors et al. 2002). Therefore, assessing participants' arousal level and establishing its link with overestimation of control could advance the current findings. Future research could also incorporate anticipated emotion (e.g., anticipated pleasure from winning or anticipated regret from losing; Cowley 2013; Perugini and Bagozzi 2001) and examine its impact on probability estimation as well as on individuals' betting decisions. Understanding the interplay between emotions and erroneous cognitions on the decision making process would further advance our understanding of gambling behaviors in uncertain contexts. Furthermore, it would be interesting to see if the illusion of control reduces followed by an undesired

outcome (Matute and Blanco 2014). If most of the predictions in the first round matches were incorrect, do inaccurate predictions reduce illusions? It would be interesting to examine if illusions change throughout the course of actions during the Championship tournament. In addition, it would be interesting to compare pathological gamblers and non-pathological gamblers in their processing of undesired outcomes in a bracket prediction setting.

Overall, the current research provides empirical evidence regarding the overestimation phenomena in one of the most widely wagered events in the U.S.–the NCAA Men's Basketball Tournament. We show that personally engaging in the selection procedure of filling out a bracket increases confidence in winning. Enhanced confidence motivates participants to wager more money, but it has no impact on actual performance, suggesting that the confidence depends on illusory perceptions. However, in an uncertain context in a competitive environment, such inflated confidence is a key determinant of task enjoyment and willingness to play a tournament bracket again.

Acknowledgments This research was funded by the Office of Research at the University of Michigan. The author would like to thank Joon Sung Lee, for his help with data collection and coding.

References

Allcock, C. (1987). An analysis of a successful racing system. In M. Walker (Ed.), *Faces of gambling* (pp. 181–187). Sydney: National Association for Gambling Studies.

Andersson, P., Edman, J., & Ekman, M. (2005). Predicting the World Cup 2002 in soccer: Performance and confidence of experts and non-experts. *International Journal of Forecasting, 21*(3), 565–576.

Ayeroff, F., & Abelson, R. P. (1976). ESP and ESB: Belief in personal success at mental telepathy. *Journal of Personality and Social Psychology, 34*(2), 240.

Burger, J. M., & Cooper, H. M. (1979). The desirability of control. *Motivation and Emotion, 3*(4), 381–393.

Cantinotti, M., Ladouceur, R., & Jacques, C. (2004). Sports betting: Can gamblers beat randomness? *Psychology of Addictive Behaviors, 18*(2), 143.

Chau, A. W., & Phillips, J. G. (1995). Effects of perceived control upon wagering and attributions in computer blackjack. *The Journal of General Psychology, 122*(3), 253–269.

Cowley, E. (2013). Forgetting the anxiety: Gambler's reactions to outcome uncertainty. *Journal of Business Research, 66*(9), 1591–1597.

Crupi, A. (2011, March 1). March Madness still one of the biggest sports franchises. *Ad Week.* Retrieved from http://www.adweek.com/news/television/march-madness-still-one-biggest-sports-franchises-1258890

d'Astous, A., & Gaspero, M. D. (2013). Explaining the performance of online sports bettors. *International Gambling Studies, 13*(3), 371–387.

deCharms, R. (1968). *Personal causation*. New York: Academic Press.

Dunn, D. S., & Wilson, T. D. (1990). When the stakes are high: A limit to the illusion-of-control effect. *Social Cognition, 8*(3), 305–323.

Dykstra, S. P., & Dollinger, S. J. (1990). Model competence, depression, and the illusion of control. *Bulletin of the Psychonomic Society, 28*(3), 235–238.

Elliot, A. J., & Harackiewicz, J. M. (1994). Goal setting, achievement orientation, and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 66*(5), 968–980.

Forrest, D., & Simmons, R. (2002). Outcome uncertainty and attendance demand in sport: The case of English soccer. *Journal of the Royal Statistical Society: Series D (The Statistician), 51*(2), 229–241.

Garbarino, E. C., & Edell, J. A. (1997). Cognitive effort, affect, and choice. *Journal of Consumer Research, 24*(2), 147–158.

Griffiths, M. (1995). Towards a risk factor model of fruit machine addiction: A brief note. *Journal of Gambling Studies, 11*(3), 343–346.

Gupta, R., & Derevensky, J. L. (1998). Adolescent gambling behavior: A prevalence study and examination of the correlates associated with problem gambling. *Journal of Gambling Studies, 14*(4), 319–345.

Hodgins, D. C., & Makarchuk, K. (2003). Trusting problem gamblers: Reliability and validity of self-reported gambling behavior. *Psychology of Addictive Behaviors, 17*(3), 244–248.

Jessop, A. (2014, January 17). The business of the bracket: How Vegas and businesses capitalize on March Madness. *Forbes.* Retrieved from http://www.forbes.com/sites/aliciajessop/2013/03/20/the-business-of-the-bracket-how-vegas-and-businesses-capitalize-on-march-madness/

Kahneman, D., & Tversky, A. (1973). On the psychology of prediction. *Psychological Review, 80*(4), 237.

Kelley, H. H. (1971). *Attribution in social interaction*. Morristown, NJ: General Learning Press.

Kwak, D. H., Lee, J. S., & Mahan, J. E, I. I. I. (2013). Ad-evoked illusory judgments in fantasy sports participation: Effects of customization level and expert information. *Journal of Sport Management, 27*(5), 393–406.

Kwak, D. H., Lim, C. H., Lee, W. Y., & Mahan, J, I. I. I. (2010). How confident are you to win your fantasy league: Exploring the antecedents and consequences of winning expectancy. *Journal of Sport Management, 24*(4), 416–433.

Ladouceur, R. (2004). Perceptions among pathological and nonpathological gamblers. *Addictive Behaviors, 29*(3), 555–565.

Ladouceur, R., Giroux, I., & Jacques, C. (1998). Winning on the horses: How much strategy and knowledge are needed? *The Journal of Psychology, 132*(2), 133–142.

Ladouceur, R., & Sévigny, S. (2005). Structural characteristics of video lotteries: Effects of a stopping device on illusion of control and gambling persistence. *Journal of Gambling Studies, 21*(2), 117–131.

Lam, D. (2007). An exploratory study of gambling motivations and their impact on the purchase frequencies of various gambling products. *Psychology & Marketing, 24*(9), 815–827.

Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology, 32*(2), 311.

Lin, C. H., Hung, H. H., & Li, Y. H. (2012). How confidence and uncertainty affect consumers' enjoyment of gambling. *Social Behavior and Personality: An International Journal, 40*(3), 425–432.

Linn, A. (2013, March 21). Going for a perfect NCAA bracket? You're more likely to win Powerball. *NBC News.* Retrieved from http://www.nbcnews.com/business/careers/going-perfect-ncaa-bracket-youre-more-likely-win-powerball-f1C8981570

Mandel, N., & Nowlis, S. M. (2008). The effect of making a prediction about the outcome of a consumption experience on the enjoyment of that experience. *Journal of Consumer Research, 35*(1), 9–20.

Matute, H., & Blanco, F. (2014). Reducing the illusion of control when an action is followed by an undesired outcome. *Psychonomic Bulletin & Review, 21*, 1087–1093.

McCarthy, M. (2012, March 27). March Madness betting now tops Super Bowl. *USA Today.* Retrieved from http://content.usatoday.com/communities/gameon/post/2012/03/march-madness-betting-bigger-than-super-bowl-ncaa-las-vegas-nevada-ncaa-mens-final-four/1#.U5XB-vldV8E

McCrea, S. M., & Hirt, E. R. (2009). Match Madness: Probability matching in prediction of the NCAA Basketball Tournament. *Journal of Applied Social Psychology, 39*(12), 2809–2839.

Moore, S. M., & Ohtsuka, K. (1999). Beliefs about control over gambling among young people, and their relation to problem gambling. *Psychology of Addictive Behaviors, 13*(4), 339.

Neighbors, C., Lostutter, T. W., Cronce, J. M., & Larimer, M. E. (2002). Exploring college student gambling motivation. *Journal of Gambling Studies, 18*(4), 361–370.

Norton, M., Mochon, D., & Ariely, D. (2011). *The 'IKEA effect': When labor leads to love*. Harvard Business School Marketing Unit working paper, (11-091).

Nower, L., & Blaszczynski, A. (2010). Gambling motivations, money-limiting strategies, and precommitment preferences of problem versus non-problem gamblers. *Journal of Gambling Studies, 26*(3), 361–372.

Orgaz, C., Estévez, A., & Matute, H. (2013). Pathological gamblers are more vulnerable to the illusion of control in a standard associative learning task. *Frontiers in Psychology, 4*, 1–7.

Perugini, M., & Bagozzi, R. P. (2001). The role of desires and anticipated emotions in goal-directed behaviours: Broadening and deepening the theory of planned behaviour. *British Journal of Social Psychology, 40*(1), 79–98.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*(4), 717–731.

Presson, P. K., & Benassi, V. A. (1996). Illusion of control: A meta-analytic review. *Journal of Social Behavior & Personality, 11*(3), 493–510.

Puca, R. M., & Schmalt, H. D. (1999). Task enjoyment: A mediator between achievement motives and performance. *Motivation and Emotion, 23*(1), 15–29.

Rogers, P. (1998). The cognitive psychology of lottery gambling: A theoretical review. *Journal of Gambling Studies, 14*(2), 111–134.

Sierra, J. J., & Hyman, M. R. (2009). In search of value: A model of wagering intentions. *The Journal of Marketing Theory and Practice, 17*(3), 235–250.

Thompson, S. C., Armstrong, W., & Thomas, C. (1998). Illusions of control, underestimations, and accuracy: A control heuristic explanation. *Psychological Bulletin, 123*(2), 143–161.