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## BLACKJACK PLAYERS DEMONSTRATE THE NEAR MISS EFFECT

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The effect of the 'near-miss' as a potential conditioned reinforcer in slot machine play has recently been the subject of behavioral research on gambling. The present study extends prior research by examining this effect during the game of blackjack. Participants consisted of college undergraduates with no history of problematic gambling. Their verbal ratings of closeness to winning were recorded and examined for each of 50 hands of standard blackjack per session. Results indicated that as the number difference between the dealer and player's hands decreased, closeness to win rating increased. Also for each participant, non-bust losses were rated closer to winning than losses where the player busted.

*Keywords:* Near miss, gambling, blackjack.

Increased psychological research on gambling has led to the discovery of many variables that work to maintain a complex behavioral phenomenon that now adversely affects 1-2% of the population worldwide (Petry, 2005). While to the outside observer, winning may be the sole factor in keeping gamblers responding, studies have shown there are other issues at hand. There seems to be some evidence that actually losing, or being exposed to certain types of losses, may also maintain gambling behavior. An example of this is what is referred to in the literature as a 'near-miss'.

Skinner (1953) was among the first to recognize the possibility of a near-miss on a slot machine functioning as a conditioned or secondary reinforcer at no expense to the owner. To illustrate, first consider that a win on a slot machine is characterized by three or

four identical symbols appearing on the payout line. Next, these symbols appear successively, one at a time from left to right. If the first two or three symbols appear identical to one another on the payout line and the last reel stops just short of displaying an identical symbol, it is easy to see how this type of loss shares the properties of a win.

Furthermore, researchers have speculated that even though the probabilities of winning on many casino type games is left purely to chance, near-misses may reinforce a particular strategy of play and increase beliefs about a future success (Reid, 1986). As far as demonstrating empirically that increased slot machine play can be a function of exposure to near-miss trials, the results have been mixed. For example, Strickland and Grote (1967) reported that participants who were exposed to a winning symbol on the first reel of a slot machine more often than others played a larger number of trials. In 2001, Kassinove and Schare investigated the effect of varied exposure to near-miss trials and found that participants who saw a near-miss 30% of the time played longer than those exposed to near-misses 15% and 45% of the time.

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Most recently, Ghezzi, Wilson, & Porter (2006) conducted a series of experiments related to the near-miss investigating the effects of both forced and varied exposure, magnitude of wins, and serial position of winning symbols on slot machine duration of play. These experiments produced mixed results differing from the findings of both Strickland and Grote (1976) and Kassinove and Schare (2001). One explanation for the inconsistency of findings in the near-miss literature may be the role of verbal behavior. Dixon and Schreiber (2004) investigated this variable in terms of the effect of exposure to near-misses on how players rated their closeness to a win on a 1-10 rating scale. The results of this study indicated that all 12 participants rated near-miss losses higher than non near-miss losses. For the majority of participants, response latencies were also larger following losing trials containing a near-miss.

While the near-miss effect has largely been studied solely in slot machines, it is worth investigating in other forms of gambling. For example, it has been proposed that the near-miss effect may also be observed in the playing of scratch off tickets (Griffiths, 1997; Moran, 1979). Table or card games may also set up a context in which it appears players come close to winning and therefore false beliefs are produced. Therefore, the purpose of this study was to examine the near-miss effect in the game of blackjack on participants' verbal responses about their chances of winning.

## METHOD

### *Participants*

Five college undergraduates (4 females and 1 male) participated in the study for course extra credit. In addition, their names were entered in a lottery to potentially win a \$50 gift certificate according to how many chips they obtained by the end of the session. Participants were administered the South Oaks Gambling Scale (SOGS) (Lesieur & Blume,

1987) and scores indicated no evidence of problematic or pathological gambling.

### *Setting*

All sessions were conducted in a quiet, university laboratory setting containing a standard casino inspired blackjack table. During sessions, only the dealer (who served as the experimenter and independent observer) and the participant were present in the room.

### *Response Measurement and Interobserver Agreement*

Participants were asked to record four dimensions of behavior on data sheets provided by the experimenters during each trial and the experimenter also recorded data on 30% of trials during all sessions. Following the play of one hand (or trial), participants were asked to circle a number from 1 to 9 with respect to the closeness to win rating. The ratings were presented on a 9-point Likert-type scale with anchors of "No Chance", "Moderate Chance", and "Good Chance" at the 1, 5, and 9 positions, respectively. Participants were also asked to record their score, the dealer's score, and a 'yes' or 'no' rating of whether the participant won the hand after each trial. Reliability was calculated as the number of agreements divided by the number of agreements plus disagreements, multiplied by 100%. Reliability was found to be 100% for the closeness to win rating, 88% for participant's score, 94% for dealer's score, and 95% for whether the participant won the hand.

### *Procedure*

After being administered the SOGS (Lesieur & Blume, 1987), participants were brought into the room and asked if they knew how to play blackjack. The basic premise of the game of blackjack is to beat the dealer's hand without exceeding a count of 21 (number cards counted as their face value, face cards counted as 10, and aces counted as either one or 11 upon the player's choosing). To

begin, players are given two cards and are shown only one of the two dealer's cards. Players then take subsequent turns either asking for more cards or remaining with what they have been dealt. The dealer then plays out his/her hand and all of the hands are tallied individually. For the purpose of the study, a 'bust loss' was denoted as any participant hand in which the cumulative number, as represented by the various cards, exceeded a score of 21 therefore preventing a win even before the dealer took their turn. A 'non-bust loss' was designated as any participant hand in which the dealer's cumulative score was higher than that of the participant's, with both not exceeding 21. If they were unfamiliar with the game, participants were given scripted verbal instructions, a written task analysis to read, and were allowed to play up to 10 practice trials. As a result, all participants demonstrated proficiency in rules of play and reported they "now knew how to play". The following instructions were then given by the dealer:

"We are going to play 50 hands of very basic blackjack. There are no 'double downs' or 'split pairs' allowed. You are allowed to bet one chip at a time and the number of chips you have at the end of the session will equal the number of times your name will be entered into the lottery. Do you have any questions?"

The experimenter then answered any questions the participant may have had, and the experiment began. Additional prompts were offered to the participant if the experimenter noticed that he or she had forgotten to record any of the five response dimensions.

## RESULTS AND DISCUSSION

To reiterate, a 'bust loss' was denoted as any participant hand in which the cumulative

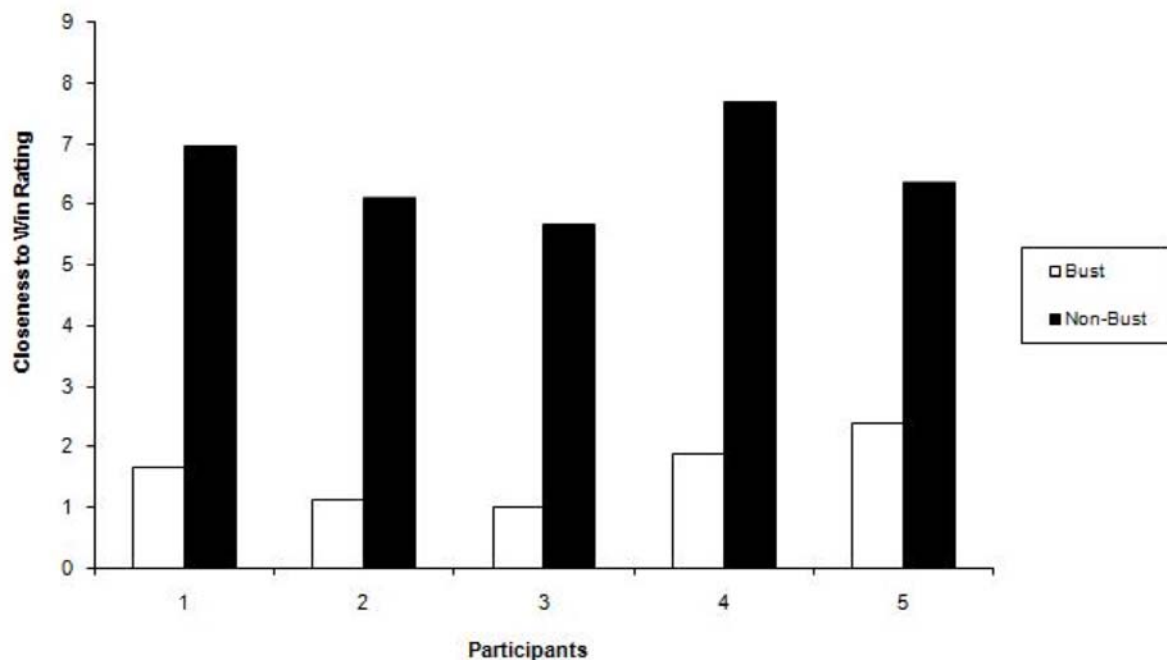


Figure 1. Participants' closeness to win rating with respect to "bust" and "non-bust" hands.

number, as represented by the various cards, exceeded a score of 21. A ‘non-bust loss’ was designated as any participant hand in which the dealer’s cumulative score was higher than that of the participant’s, with both not exceeding 21. The percentage of total losses that could be categorized as non-busts for Participants 1, 2, 3, 4 and 5 were 50%, 72%, 62%, 61%, and 68%, respectively. Across the 50 hands, Participant 1 won 15 and lost 29 chips, Participant 2 won 23 and lost 22 chips, Participant 3 won 21 and lost 24 chips, Participant 4 won 30 and lost 15 chips, and Participant 5 won 28 and lost 13 chips. Because of the trials that resulted in a ‘push’ (the dealer and player’s hand count was even), wins and losses will not necessarily add up to 50. Each participant’s average closeness to win ratings for bust and non-bust losses is depicted in Figure 1. Figure 2 shows average closeness to win ratings as a function of the number difference between the dealer and participant’s hands at the end of a trial. This figure includes both bust and non-bust losses.

The near miss effect often seen in slot-machine play (Parke & Griffiths 2004; Dixon & Schreiber, 2004) has never been replicated in other games of chance, until the present study. From the data shown, we can see that a ‘non-bust’ loss in the game of blackjack has parallels to the ‘near-miss’ effect in slot-machine play that has been demonstrated in the literature (Dixon & Schreiber, 2004; Kassinove & Schare, 2001; Strickland & Grote, 1967). Specifically, participants apparently held irrational beliefs about winning (evidenced through higher “closeness to win” ratings for non-bust as compared to bust losses) because the ‘non-bust’ loss functions as a conditioned reinforcer (i.e., not going over 21 shares the properties of a win). This can be explained by the rules of the game itself in that the probability of reinforcement after a bust loss decreases to zero, while in a “non-bust” loss, there is still a chance that reinforcement will come once the participant “stands” at a number 21 or lower.

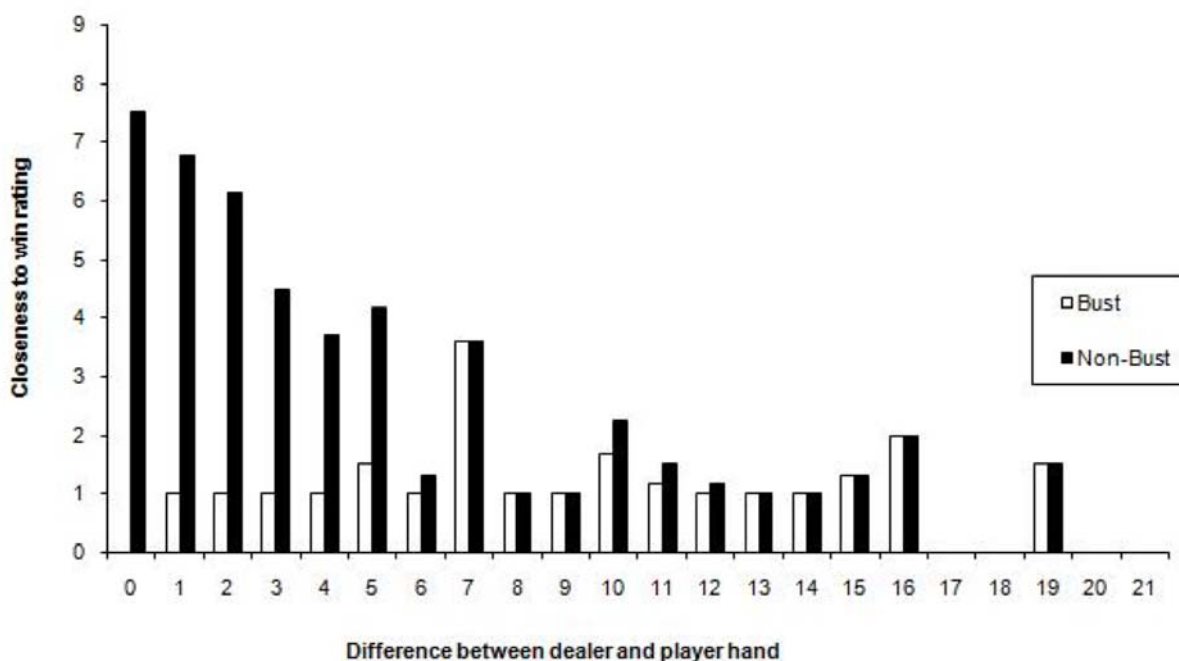


Figure 2. Participants’ closeness to win rating with respect to the difference between the dealer and player hand score

It appears that the effect of nearly winning is similar in both games, however further analysis reveals that the game of blackjack is different. For example, the near-miss phenomenon in this case may present itself through two factors. Not only did participants rate non-bust losses higher than bust losses, but average rates of closeness varied as a function of the number difference between the player and dealer's hands for non-bust losses. That is, as the number differences between the two hands decreased, participants' closeness to win ratings increased. The same did not hold true for bust losses as these stayed more constant.

A possible confound to the present study was the individual participant's experience with the game of blackjack. The amount of risk taken and strategy of play may differ among individuals with varying levels of experience. Without a prescreening of a participant's self-reported experience, we could not account for his or her knowledge of the game. Another limitation of the study was that all of the measures relied on self report from the participant. Future studies should incorporate more objective measures such as duration of play.

Extensions to the current experiment could include the investigation of the near-miss effect in scratch-off tickets, poker, and roulette. Furthermore, a simulated manipulation of the types of losses seen in these games using computer software could be advantageous in that we could assess the "breaking point" at which participants feel they've shifted from "close to winning" to "not close to winning". Another possible extension would be the inclusion of a protocol analysis of participant's verbal behavior during play. This would enable experimenters to access possible rule-governed and/or covert verbal behavior.

Since the game of blackjack is typically played with multiple players at a time, another interesting avenue of research would be to evaluate the effect of social contingencies

on the near miss effect found in this game. For example, it could be investigated whether other participant ratings or even wins/losses affect the way players interpret the results of their own cards. Until an extension involving multiple blackjack players is conducted, it should be noted that it is still unknown how the results of the current study would generalize to more typical conditions of the game.

In conclusion, the above study extended prior investigations of the near-miss effect in slot machines (Dixon & Schreiber, 2004; Ghezzi et al., 2006; Kassinove & Schare, 2001; Strickland & Grote, 1967) to the game of blackjack. Although gaming control boards have reduced the amount of slots programmed to produce near-misses (Ghezzi et al., 2006), we shouldn't overlook aspects of other games that may automatically produce the effect. It is only with further analysis that we can work to uncover all of the variables that maintain gambling behavior to address this widespread societal problem.

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