

Software Announcements

Toward Molecular Analysis of Video Poker Play

Reasons why individuals continue to engage in casino gambling behavior after sustaining repeated losses are seldom derived from empirical observation. Although suggestions as to what maintains gambling have been based on characteristics of the person playing (Gilovich, 1983; Wagenaar, 1988) or the characteristics of the gambling environment (Anderson & Brown, 1984), the characteristics of the casino game itself are relatively unknown. One would assume that if there were no chance of winning money on a gamble, an individual would not engage in behavior that would lead to a sure loss. With the game being a source of probabilistic reinforcement, repeated exposure to such a game may increase the behavior of playing it over time.

In addition to delivery of probabilistic reinforcement, another characteristic that may maintain or increase the behavior of playing many casino games is that they contain an "illusion of control." This "illusion" is constructed by allowing the player to engage in a decision that actually has no bearing on the probability of winning. It has been suggested that such active decision making on the part of the player may lead to behavior whereby people believe that their chances of success at a task are greater than they would be if no decision were required (Koehler, Gibbs, & Hogarth, 1994). Such perceived control over completely probabilistic situations often leads gamblers to claim that winning is due more to their ability to play the game than to chance factors (Chau & Phillips, 1995). These overestimations by the gambler of actual probabilities have been referred to as *subjective probabilities* (Dixon, Hayes, & Ebbs, 1997; Kahneman & Tversky, 1972; Rachlin, Raineri, & Cross, 1991).

Video Poker is one such game wherein the gambler must engage in a decision-making response. In Video Poker, the player is dealt 5 cards face up from a 52-card deck and given the opportunity to choose which cards he/she wishes to keep or hold. Once this decision has been made, the player presses a "Draw" button and receives new cards to replace those not initially held. A winning hand is determined if the player's final 5 cards contain a certain series of card pairs, consecutive numbers, or card suits. Although a highly skilled video poker player may improve his/her odds of winning over an inexperienced player, the odds of winning are never higher than 1. In other words, a player can never "beat" the machine.

Program operation. This program is written in Visual Basic 4.0 for IBM-compatible computers running under the Microsoft Windows '95 operating system. Visual Basic is an object-oriented program which uses Windows '95

libraries to display graphical images, play audio (.wav) files, and collect responses when participants use the mouse to click buttons or check option boxes. Visual Basic programming code can be compiled into an executable file (.exe) and run on any IBM-compatible system with Windows '95, without one's having to purchase Visual Basic itself. This allows many users to run a Visual Basic program without adding the programming language to each computer.

Using a Windows-type drop-down menu, the experimenter can easily change the following parameters of the game before it begins: (1) the number of coins (credits) the player begins with; (2) the maximum number of coins that can be bet on each trial; (3) whether coins played are subtracted from cumulative coins; (4) whether a subjective probability question (asking the player to estimate how many trials it will be until he/she has a win) is displayed after winning trials, after every trial, or on no trial; and (5) specific magnitudes of reinforcement for all possible winning hands.

Figure 1 shows screen graphics of the program, which were designed to replicate an actual video poker machine.

Five playing cards are displayed face down across the middle portion of the monitor on a green background before play is begun. A payoff table, which indicates the winning hands and their payout in coins, is located above the five cards. By clicking the mouse pointer on an image of a coin located in the upper right corner of the screen, the player is able to bet one to eight coins per hand. Each additional coin wagered increases the payoff table's values proportionally. For example, on a one-coin bet, a pair of Jacks would pay off one coin. On a four-coin bet, a pair of Jacks would pay off four coins. If the player is required to make subjective probability estimations on the number of trials before a winning hand, a rectangular box displaying this appears, and the player must choose a number between 1 and 10 trials before continuing.

Once the desired number of coins is bet, the player clicks on the "Deal" button located at the bottom of the screen. Five cards are randomly dealt from a standard deck of 52 cards. This ensures that each card has an equal probability of being dealt. If all 5 cards are to the player's satisfaction, he/she clicks on the "Stand" button. Otherwise, the player indicates which of the cards he/she wants to keep by clicking on the "Hold" buttons located below the cards. The word "Held" is displayed above cards selected. If the player makes a mistake or changes his/her mind regarding the cards held, he/she can click on the "Cancel" button, which clears all the "Helds" displayed above the cards. Once a final decision has been made as to which cards will be held, the player clicks on the "Draw" button. New

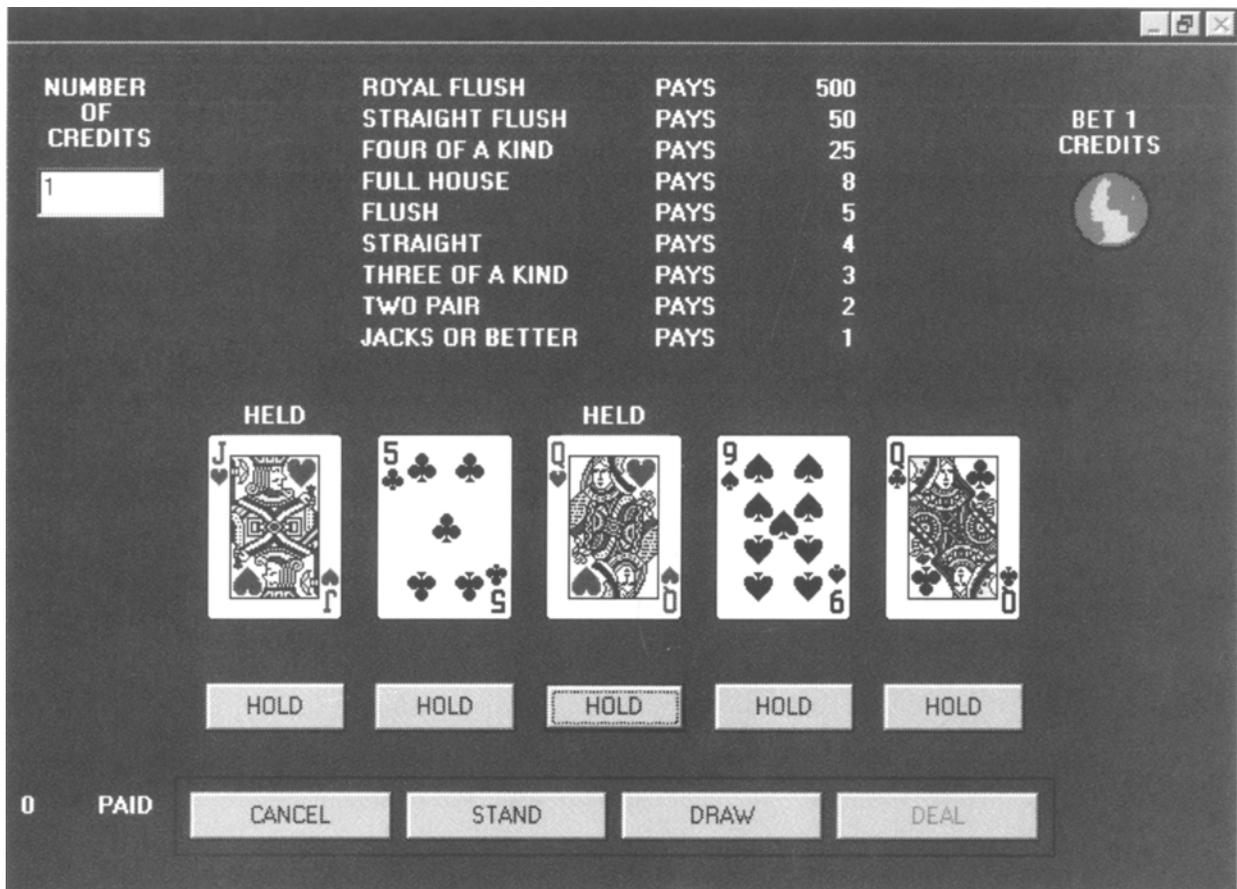


Figure 1. Screen graphics of the video poker program.

cards are then randomly dealt from the remaining 47 cards and replace those not held on the initial 5 cards. If the final 5 cards are of a series that meets the criteria of the payoff table, the player wins the corresponding number of coins. If the final 5 cards are not of criteria, the trial ends. The number of coins paid out for that trial and cumulative coins won for that session are displayed on the screen.

The program writes data for every trial into a text (.txt) file. The file contains comma separation between each data point so that it can be easily imported into spreadsheets, graphics, or data analysis programs. Headings are also provided for the user to identify which column of data represents which dependent measure. Response-based measures include coins bet, coins won, cumulative coins, subjective probability estimations (when applicable), cards held, cards discarded, and the final five cards. Time-based measures include intertrial interval, total engagement time, hand decision time (time from the display of the first five until the "Stand" or "Draw" button is clicked), and subjective probability decision time (time from the display of the subjective probability question until a response is made to that question).

Such data collection on a trial-by-trial basis may allow for a better understanding of the effects of programmed

contingencies of an actual casino game which may maintain, increase, or decrease gambling behavior. Some ideas for future research using this program include (1) examining whether the last string of losing hands followed by a win affects the subsequent subjective probability estimation of the next win, (2) investigating the decision-making strategies and their respective duration as a function of density or magnitude of payoffs, (3) determining whether interresponse time and/or engagement time varies as a function of payoffs and/or subjective probability estimations, (4) examining how play strategies change as a function of reinforcement density for given winning hand combinations, and (5) removing the "illusion of control" by requiring the player to "Stand" on every trial to determine how many of the response and time-based dependent variable measures are disrupted.

Availability and equipment requirements. The program is currently available free of charge to anyone who sends three blank 3.5-in. high density disks. It has been designed to run on Windows '95 and requires at least 16 MB of RAM, as well as about 2 MB of hard drive space. Both sound card and speakers are also required for hearing the game sounds of coins being inserted into the machine, and coins dropping out of the machine on winning

hands. Program and reprint requests should be sent to M. R. Dixon, Trinity Services, Inc., 100 North Gougar Road, Joliet, IL 60432 (e-mail: mdixonts@aol.com).

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