CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Alexander R. McGrath

Project Number
J1407

Project Title
Playing the Odds: An Optimal Strategy for Draw Poker

Abstract

Objectives/Goals
In my experiment I used probability theory to develop an optimal strategy chart for five card draw poker. I wanted to find out more about the effectiveness of scientifically produced strategy charts. I also wanted to see if the actual distribution of poker hands dealt was similar to the expected distribution.

Methods/Materials
I created a strategy chart using combinatorial mathematics and statistical simulation. The chart was tested against a variety of human opponents and sample strategies. I played a total of 500 hands. I drew cards based strictly on my strategy chart and my opponent drew cards based on his or her personal strategy. The winning outcome and the ranks of each starting hand were recorded.

Results
The data has shown that my strategy chart will, over the long run, tend to beat most players and most other strategies. Additionally I found that the actual distribution of hands received matched the expected probability distribution (with 92.4% confidence). If I had experimented with more hands, I believe that the confidence would be even higher.

Conclusions/Discussion
My experiment has shown that probability theory can be used to your advantage in games such as draw poker or blackjack by creating and using a consistent strategy chart to aid you in your play.

Summary Statement
In my project I used probability theory to develop an optimal strategy chart for five card draw poker and I validated my chart through statistical simulation and live experimentation.

Help Received
Parent provided help with statistical graphics.