

Using Statistical Analysis and Probability to Examine a Counterintuitive Problem

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The purpose of this project is to demonstrate the mathematical principles of the Monty Hall problem. The Monty Hall problem is a three door probability puzzle loosely based on the television game show, Let's Make A Deal. The hypothesis is if the original choice does not change the chance of winning is 33.3%, but if the choice changes the chance of winning increases to 66.7%. First, the probability of staying with the original choice and the probability of switching choices were both calculated. Second, a computer model of the Monty Hall problem was built. It was run 100 times staying with the original choice and 100 times with switched choices. This process was repeated twice. The probability of winning with the original choice was calculated at 33.3%. The probability of winning by switching was calculated at 66.7%. The first experiment showed staying with the original choice resulted in winning 34% of the time and switching resulted in winning 72% of the time. The second experiment showed staying with the original choice resulted in winning 31% of the time and switching resulted in winning 69% of the time. The third experiment showed staying with the original choice resulted in winning 29% of the time and switching resulted in winning 65% of the time. The conclusion is switching to an alternative choice increases the chance of winning. The application is because this experiment demonstrates that results are often counterintuitive there is a need to examine problems using mathematical processes.