The full Monty *by Derrick Browne*

Last week we considered the Principle of Restricted Choice (more on this later). A closely related paradox is the legendary Monty Hall problem, named after the host of *Let's Make a Deal*.

The game show host offers a contestant a choice of three doors, one hiding a car and two hiding goats: “Please choose a door. Then I shall open a door, not the door you chose and not the door concealing the car. Then I will give you the opportunity to switch to the other unopened door if you wish.”

Should the contestant switch doors?

This controversial problem achieved prominence in 1990 when it appeared in the Parade Magazine column of Marilyn vos Savant, who had been in the Guinness Book of World Records for Highest IQ (228) until that category was removed in 1989. Incidentally, she advocates that children take the surname of the parent of the same sex, and her mother was born of a marriage between a Mr vos Savant and a Ms Savant, hence her own apt surname (a savant is a wise person).

The 2008 movie *21* opened with a maths professor (Kevin Spacey) explaining the Monty Hall problem. It also featured in the drama series NUMB3RS, and the novel *The Curious Incident of the Dog in the Night-time*.

Ironically, Monty himself stated back in 1975, in a letter published in *The American Statistician*, that the Monty Hall problem did not pertain on his show because he did not allow a change of choice in such games. He concluded his letter by saying: “Next time let's play on my home grounds. I graduated in chemistry and zoology. You want to know your chances of surviving with our polluted air and water?”

But back to the problem as posed. You have chosen a door, and the host has opened one of the other two doors, ensuring it is one which does not have the car. How likely is it that the door that you chose originally is the one with the car? How likely is it that the other remaining door is the one with the car?

Most people assume that each of these doors has equal probability. That was initially the case - but not now that the host has opened one of the other doors in a specific way, namely to always reveal a goat. In fact, the odds are two to one in favour of switching doors.

It may help to go back a step to initial probability, which was one chance in three that the contestant had chosen the door with a car. Given that Monty always then shows a door with a goat, this cannot affect the contestant's odds of the initial door being right, so it is still one chance in three.

It was a two in three chance that one of the other two doors had the car and that still pertains. The difference is that now we have seen into one of those doors and so the entire two-thirds chance of success is concentrated into the other one, hence the need to switch.

Enough already; back to bridge:

WEST	EAST
S 432	S AJT
H AKJ	H 642
D J43	D AKQ8
C AKJ5	C Q32

West opened a 15-17 1NT. East raised to 4NT, which is a quantitative invitation to slam (not Blackwood). West was maximum so accepted. North led a club.

Declarer can count four tricks in each minor, two in hearts, and one in spades. The finesse in hearts or the double finesse in spades each offer possibilities for the twelfth trick.

Say declarer leads a low spade from West to finesse dummy's S10. This will only meet with immediate success if North has both the SK and SQ, about one time in four. That may not seem like good odds but given that declarer can afford to lose a trick and there will still be time to try the heart finesse or repeat the spade finesse later, it was the right play.

South wins the SQ. Which opponent is likely to have the SK?

Most would say it's an even money bet. But, forearmed with knowledge of the Monty Hall problem, we can do better. Simplified slightly, there are three equally likely layouts where South wins the first spade trick:
1) South has K only = 1/3
2) South has Q only = 1/3
3) South has K-Q only =1/3
But here's what we know **after South wins the first trick with the Q**:
~~1) South has K only = 1/3~~
2) South has Q only = 1/3
3) South has K-Q *and plays the Q* = 1/6
~~4) South has K-Q *and plays the K* = 1/6~~

We’re left with two options: one, an original 1/3 chance that South started with Q only or, if you like bad bets, you could go for the original 1 in 6 chance that South started with K-Q (and chose to play the Q first).
1/3 is twice as likely as 1/6 so we should back the first proposition: that South started with Q only.

Bottom line: you should finesse again in spades, rather than try the 50% heart finesse.