Friday, January 28, 2000
[Appeared in the Adelaidean, 14 Feb 2000, page 4.]
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Gambling study shows it's good to be bad

Gambling, genetics, the economy and swinging voters what do they all have in common?

The answer: we can now start to better understand each and every one of them thanks to Parrondo's paradox, a mathematical theory developed by a Spanish physicist which explains how we can mix "bad" strategies and get a "good" outcome.

A scientist and engineer at Adelaide University, Dr Derek Abbott, has now taken that theory one step further by demonstrating it in a unique gambling study.

Dr Abbott and colleague Mr Greg Harmer have shown that two "bad" (losing) games played by tossing coins can be mixed together to produce a win or a "good" outcome.

When played separately, each toss of the coin guarantees a loss. But when played alternately, the losing coins come up winning, time and again.

Dr Abbott describes this as a "ratchet effect", like shaking a bag of nuts to force the large ones to the top.

"Shaking is normally regarded as something 'bad' because it creates disorder, but in this case it is 'good' because the desired response is produced.

"In chess we can sacrifice pieces to win. Farmers know that sparrows can eat all the crops and insects can eat all the crops but by having a mixture of sparrows and insects, some crops survive because the sparrows also eat the insects. In a similar way, mixing two losing games wins when there is a subtle link between them."

Dr Abbott says the implications for the further development of this theory are almost inexhaustible.

"We're now studying how to apply the mathematical theory we have developed, for these simple games with coins, to the economy and biology.

"It could help to answer financial questions, such as finding the best strategy for combining high-risk shares and cash reserves in managing an investment portfolio.

"In biology, a population of animals contains a certain pool of genes, some of which are good and some bad. Considering probabilities that certain genes become expressed, in each generation, is rather like a gambling game.

"Some bad genes may become beneficial if there is a change in the environment," he says. "For instance, a DNA error causes sickle-cell anaemia and is common in West Africa where it also protects against malaria."

In politics, Parrondo's paradox may also be at work. Could a bad strategy be good in some cases? Does some notoriety and scandal increase Bill Clinton's popularity?

Dr Abbott believes Parrondo's paradox could also help explain one of the biggest mysteries of all time:

"One of the great mysteries is 'biogenesis', or how life began from a 'primordial soup' of chemicals. The problem is when simple amino acids were formed by chance, there would have also been many other influences tending to destroy the order produced. Perhaps in the biogenesis of life Parrondian principles are at play, where life is formed via a 'ratcheting action' from the primordial soup. The game of life may well have been helped by the very influences we thought were destructive."

World-renowned scientist Professor Paul Davies also believes that life must have started via a "molecular ratchet mechanism", but that we still need to fill in the details.

"Anything that clarifies how information and organised complexity can emerge from the randomness of molecular chaos will cast welcome light on this most profound of scientific mysteries. That is the significance of Parrondo's paradox, and the associated work of Derek Abbott," he says.

"Great discoveries change the way we see everything," says Dr Abbott. "Without a doubt, Parrondo's paradox has the potential to do that, because one of its main messages is that 'a little bit of badness is good'."

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