

# New model more accurately predicts choices in classic decision-making task

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Which door will you choose? New model helps predict what choices people make in the Iowa Gambling Task by focusing on the 'exploratory strategies' they use. Credit: dil/unsplash.

A new mathematical model that predicts which choices people will make in the Iowa Gambling Task, a task used for the past 25 years to study

decision-making, outperforms previously developed models. Romain Ligneul of the Champalimaud Center for the Unknown in Portugal presents this research in *PLOS Computational Biology*.

The Iowa Gambling Task presents a subject with four virtual card decks, each containing a different mix of cards that can win or lose fake money. Without being told which decks are more valuable, the subject then picks cards from the decks as they please. Most healthy people gradually learn which decks are more valuable and choose to pick cards only from those decks.

Earlier studies have used Iowa Gambling Task data to build mathematical models that can predict people's card-picking choices. However, building such models is computationally challenging, and previously developed models do not account for the exploratory strategies people use in the task.

In reviewing previously collected data from 500 subjects, Ligneul found that healthy people tend to cycle through the four decks and pick one card from each, especially at the beginning of the task. He then incorporated this behavior, termed sequential exploration, into a new [mathematical model](#) that also accounts for the well-known reward-maximizing behaviors people exhibit in the task.

Ligneul found that his new model outperforms earlier models in predicting people's card-picking choices. He also found that sequential exploration behaviors seem to decline as subjects get older, perhaps because of neurological changes typically associated with aging.

"This study provides a mathematical method to disentangle our drive to explore the environment and our drive to exploit it," Ligneul says. "It appears that the balance of these two drives evolves with aging."

The new [model](#) and findings could help refine insights gleaned from the Iowa Gambling Task. It could also improve understanding of learning and decision-making disruptions that are associated with aging and various neuropsychiatric conditions, such as addiction, impulsive disorders, [brain injury](#), and more.

**More information:** Romain Ligneul et al, Sequential exploration in the Iowa gambling task: Validation of a new computational model in a large dataset of young and old healthy participants, *PLOS Computational Biology* (2019). [DOI: 10.1371/journal.pcbi.1006989](https://doi.org/10.1371/journal.pcbi.1006989)

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