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Practice makes perfect, but not when it comes to decisions about risk

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People aren't always good at making informed decisions that involve risk, but a new study shows that even when we know the likelihood of certain outcomes based on statistical evidence or our own experiences, we still make decisions at odds with the probability of their occurrence. The study, conducted by researchers at New York University and Université Paris Descartes, appears in the journal *Psychological Science*.

Psychology research on risk and decision-making often employs questions about gambling—where information about probabilities is given explicitly in numerical form. For instance, in experiments, participants may be asked, "Would you rather have a 50:50 chance of winning $100 or otherwise $0, or would you rather just take $40?" The consensus in the field is that decision makers, confronted with such possibilities, make poor decisions. They do not maximize their possible winnings and sometimes their choices are logically inconsistent with one another.

In everyday life, though, we are rarely given explicit estimates of probability. Therefore, what probability information people have is based primarily on their own past experience. In fact, researchers in several laboratories have conjectured that, when information about probability is learned through experience, people make better decisions.

The researchers at NYU and Université Paris Descartes wanted to test this claim. In the Psychological Science study, participants first played a video game that included firing computerized bullets at different-sized

rectangles on the screen. The game was set up so the bullets took a zig-zagging trajectory and, as a result, often missed their target. This meant the chances of hitting a rectangle increased with its size—it was simply easier to strike a bigger target, and participants gradually learned the link between rectangle size and probability.

Following training, the researchers compared performance in two different decision tasks. The first was a "classical" decision task where participants chose between alternatives with probabilities of different outcomes given explicitly. The participant always chose between a larger probability of getting $1 and a smaller probability of getting $2. In the second (decision from experience), though, they saw two rectangle targets differing in size. They were told that the larger target was worth $1 if they hit it while the smaller—and harder to hit—target was worth $2. The experimenters adjusted the size of the larger rectangle so that the participant's probability of hitting it was matched to the larger probability in the "classical" task. They adjusted the size of the smaller rectangle so that the participant's probability of hitting it was identical to the smaller probability in the "classical" task. As a result, the motor and classical decision tasks were mathematically identical.

Despite hundreds of trials of training, participants were still markedly sub-optimal in the decision-from-experience task. They showed the same kind of misuse of probability as found in typical decision tasks with probabilities explicitly given in numerical form. In summary, practice alone isn't enough to get people to make good decisions based on risk, explained Laurence Maloney, a professor in NYU's Center for Neural Science and Department of Psychology, one of the study's co-authors.

"You could imagine taking someone and saying, well, let's practice them over and over and over again until they're experts and maybe their decision-making will be perfect," he said, adding that's not what

happened in his experiment. "Basically, the key idea is that people have a distorted appreciation of probability, and it doesn't go away even when you become one of the world's experts at shooting rectangles."

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