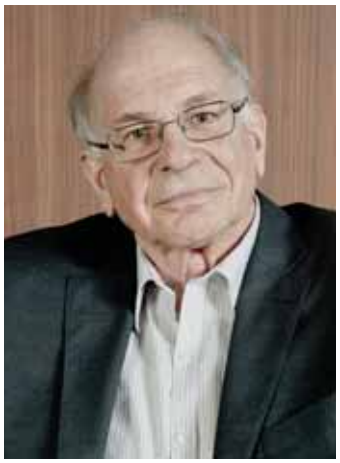
Using Expected Value to Make Investment Decisions



Daniel Kahneman, a professor at Princeton University, became the first psychologist to win the Nobel Prize in Economic Sciences. The prize was awarded for his "prospect theory" about investors' "illusion of control."

EXAMPLE 5 Using Expected Value

Analyze the mathematics in the following description of Daniel Kahneman and Amos Tversky's "Prospect Theory: An Analysis of Decision under Risk."

> "A problem is positively framed when the options at hand generally have a perceived probability to result in a positive outcome. Negative framing occurs when the perceived probability weighs over into a negative outcome scenario. In one of Kahneman and Tversky's (1979) experiments, the participants were to choose one of two scenarios, an 80% possibility to win \$4,000 and the 20% risk of not winning anything as opposed to a 100% possibility of winning \$3,000. Although the riskier choice had a higher expected value ($\$4{,}000 \times 0.8 = \$3{,}200$), 80% of the participants chose the safe \$3,000. When participants had to choose between an 80% possibility to lose \$4,000 and the 20% risk of not losing anything as one scenario, and a 100% possibility of losing \$3,000 as the other scenario, 92% of the participants picked the gambling scenario. This framing effect, as described in . . . Prospect Theory, occurs because individuals over-weigh losses when they are described as definitive, as opposed to situations where they are described as possible. This is done even though a rational economical evaluation of the two situations lead to identical expected value. People tend to fear losses more than they value gains. A \$1 loss is more painful than the pleasure of a \$1 gain." Johan Ginyard

SOLUTION

Here are the first two options the participants were given.

Greater expected value

		Expected Value
Option 1:	80% chance of gaining \$4000 20% chance of gaining \$0	$(0.8)(4000) + (0.2)(0) = \$3200$
Option 2:	100% chance of gaining \$3000	$(1.0)(3000) = \$3000$

Preferred by participants

Here are the second two options the participants were given.

Preferred by participants

		Expected Value
Option 1:	80% chance of losing \$4000 20% chance of losing \$0	$(0.8)(-4000) + (0.2)(0) = -\$3200$
Option 2:	100% chance of losing \$3000	$(1.0)(-3000) = -\$3000$

Greater expected value

What Kahneman and Tversky found surprising was that in neither case did the participants intuitively choose the option with the greater expected value.

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Describe other situations in which people fear losses more than they value gains.