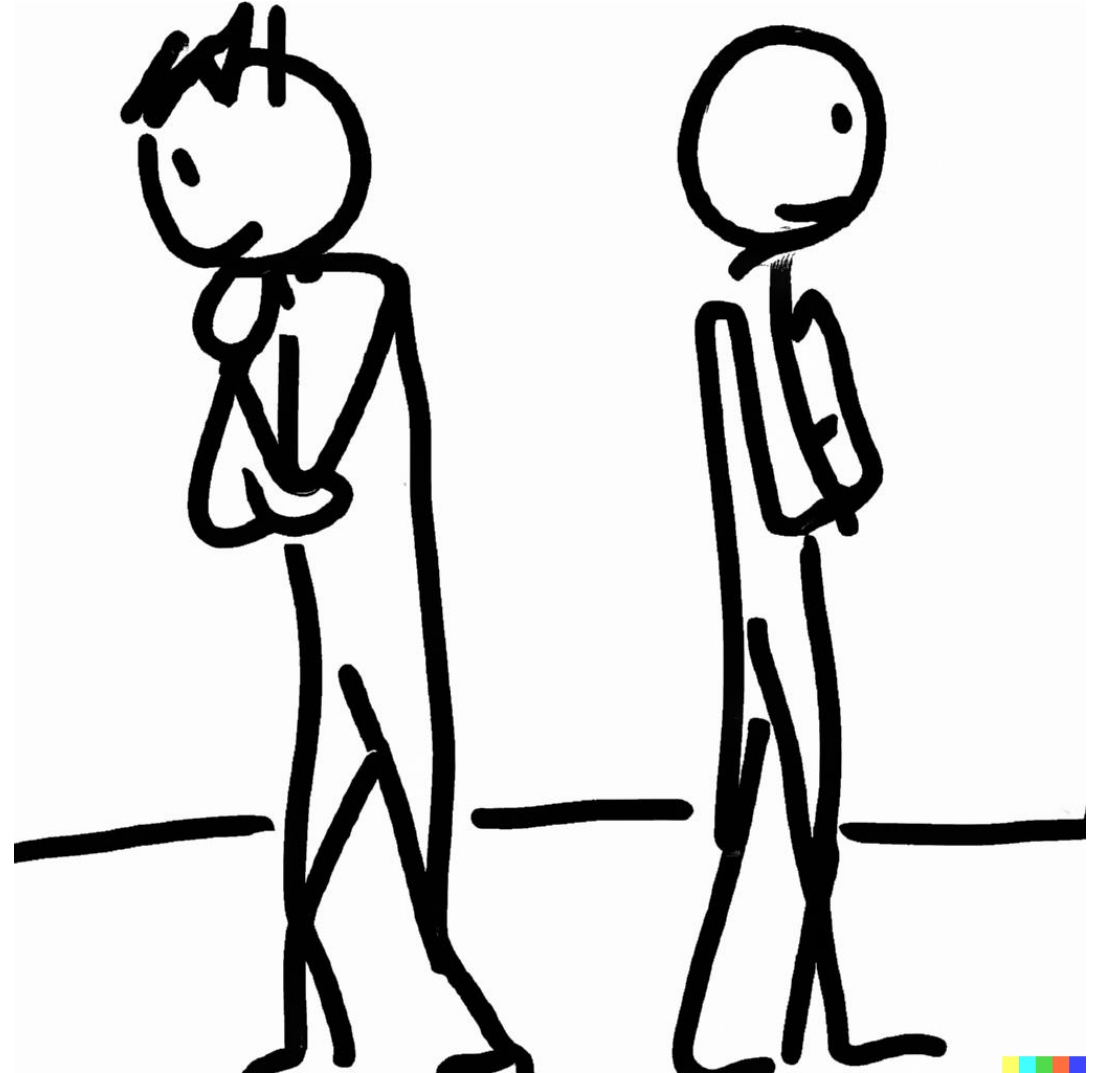


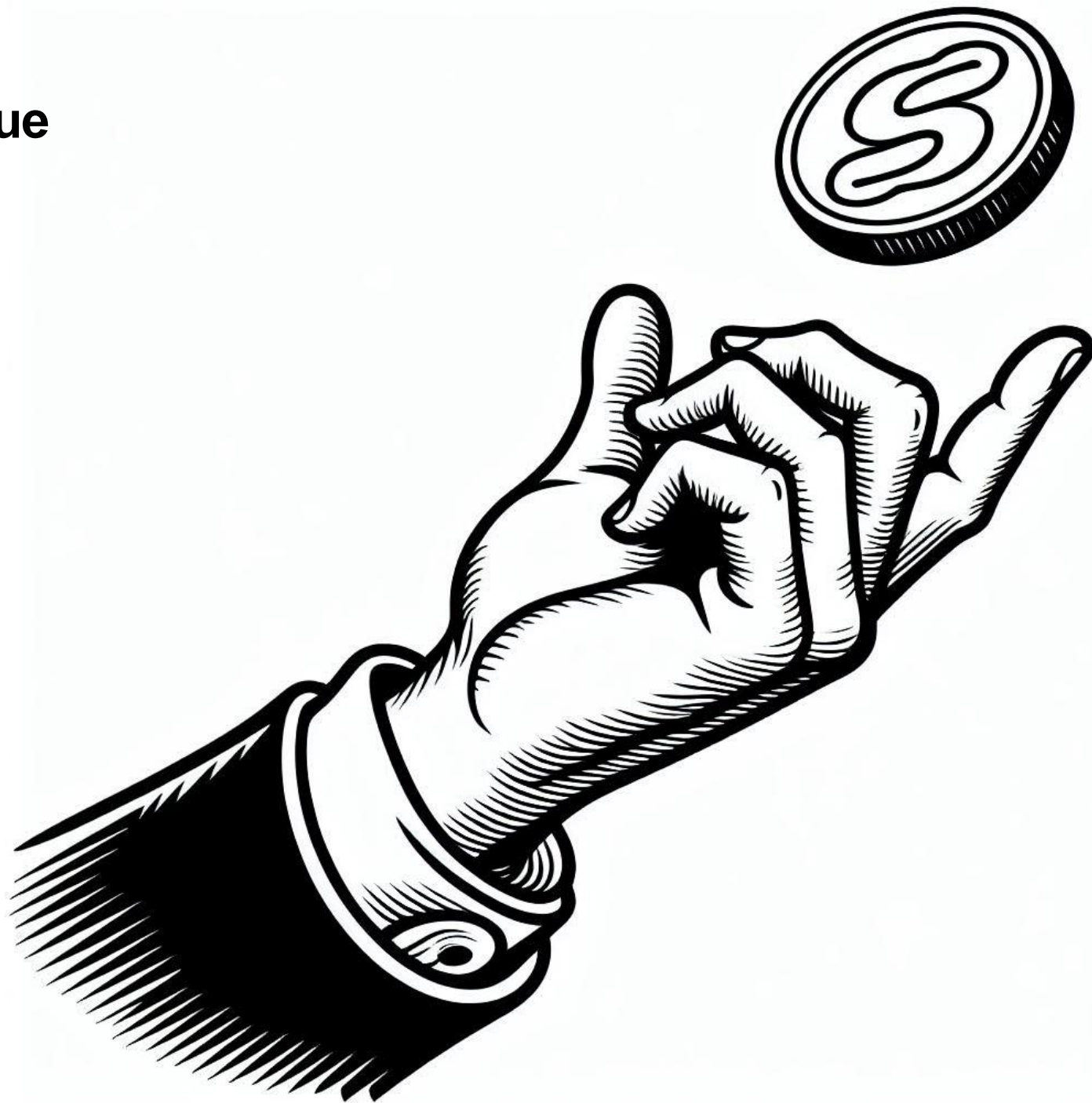
Expected value

Notes on Behavioural Economics

Jason Collins



Expected value



Expected value

$E[X]$: the probability-weighted sum of the potential outcomes

Expected value

Probability

Outcome

50%

+\$1

50%

-\$1

$$E[X] = 0.5 \times 1 + 0.5 \times -1 = 0$$

Expected value

$$E[X] = p_1x_1 + p_2x_2 + \cdots + p_nx_n$$

$$= \sum_{i=1}^n p_i x_i$$

Expected value

You are offered bet with a 50% chance of winning \$10 and a 50% chance of losing \$8.

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You are offered bet with a 50% chance of winning \$10 and a 50% chance of losing \$8.

$$\begin{aligned} E[X] &= \sum_{i=1}^n p_i x_i \\ &= 0.5 \times 10 + 0.5 \times (-8) \end{aligned}$$

Expected value

You are offered bet with a 50% chance of winning \$10 and a 50% chance of losing \$8.

$$\begin{aligned} E[X] &= \sum_{i=1}^n p_i x_i \\ &= 0.5 \times 10 + 0.5 \times (-8) \\ &= \$1 \end{aligned}$$

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Your chance of winning increases to 60%.

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$$\begin{aligned} E[X] &= \sum_{i=1}^n p_i x_i \\ &= 0.6 \times 10 + 0.4 \times (-8) \end{aligned}$$

Expected value

Your chance of winning increases to 60%.

$$\begin{aligned} E[X] &= \sum_{i=1}^n p_i x_i \\ &= 0.6 \times 10 + 0.4 \times (-8) \\ &= \$2.80 \end{aligned}$$

Expected value

You are offered a bet with a 50% bet chance of winning 50% of your wealth and a 50% of chance of losing 40% of your wealth.

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You are offered a bet with a 50% bet chance of winning 50% of your wealth and a 50% of chance of losing 40% of your wealth.

$$\begin{aligned} E[X] &= \sum_{i=1}^n p_i x_i \\ &= 0.5 \times 0.5W + 0.5 \times (-0.4W) \end{aligned}$$

Expected value

You are offered a bet with a 50% bet chance of winning 50% of your wealth and a 50% of chance of losing 40% of your wealth.

$$\begin{aligned} E[X] &= \sum_{i=1}^n p_i x_i \\ &= 0.5 \times 0.5W + 0.5 \times (-0.4W) \\ &= 0.05W \end{aligned}$$