**Monetary reward and target prevalence in a baggage-screening task**  
Value optimization in visual search

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**Are people able to exploit visual search to maximize monetary gain?**

- Simulated luggage search task
  - Search for guns and knives (2AFC)
  - Manipulated monetary incentives
  - 4 set sizes (3, 6, 12, 18)
  - Full feedback: practice and experimental blocks

**Task without payoffs**
- People are fast and accurate
- The decision criterion is in blue

**Task with payoffs**
- People may trade off accuracy for gain
- The decision criterion is in red

**Signal detection model of the ideal observer**

The ideal observer maximizes expected value (EV) per trial.

$$EV = v_1 P_H + v_2 P_F + v_3 (1-P_H) + v_4 (1-P_F)$$

- $v_i$: an outcome from one of the payoff matrices used in the experiments
- $P_H$: probability of target presence
- $P_F$: probability of target absence
- $P_A$: probability of a hit
- $P_A$: probability of a false alarm

**Economic decisions under uncertainty**

- People do not maximize EV (Kahnemann & Tversky 1979)

**Perceptual decisions under uncertainty**

People may maximize EV (Trommelhauser et al. 2006): maximum of the black line

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**Conclusions**

People do not maximize EV in economic decisions, but they do when they can exploit perceptual information.

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**References**