IOWA Gambling Task

**1: What is** **Somatic marker hypothesis**: 🡪 motivated behaviour is influenced by neural representations of body states (the “somatic markers”), whose reexperiencing can shape behaviour positively or negatively; the hypothesis is that evaluation of one’s own body states makes important contributions to decision making

**2: Introduction**: This experiment is investigating decision-making under imperfect circumstances: not all information is available (like real-life decisions)

**3: Hypothesis:** Participants will use the emotional and somatic markers to inform their decisions

* Forming a strategy that will lead to higher profit in session 2 compared to 1
* Older individuals are expected to have lower risk tolerance, drawing more selectively from safer decks, earning more money

**4: Method**: **Iowa gambling task**: Computer based card drawing game.

- Start with 2000 DKK and draw cards from 4 different decks

- Different probabilities for punishment and reward and different values

- Decks A and B are net losses, C and D are net gains

- 2 sessions of 100 draws each, naïve to number of draws

- Reflection on deck values between sessions

Figure 1: Number of draws from each pile in each session

* **Session 1**: Draws are more spread out, though most in CD
* **Session 2:** Same, but enhanced effect.
* Participants have learnt deck ratios in session 1 can skip learning in session 2 🡪 more profit (individual plots)

Table 1: Paired samples t-tests between A+B and C+D

- More draws from profitable decks in both sessions -> greater effect in session 2

- Earnings increased by ~50% between sessions 🡪 Participants sticking with learnt strategies

**5: Results** End capital

- Testing if **end capital differed from 2000 DKK** (result with random draws) 🡪 No difference in session 1 🡪 deciding on strategy late if at all 🡪 Significant difference in session 2 🡪 effective strategy

- **End capital for session 1 and 2 are correlated** 🡪 discovering strategy in 1 lead to profit in 2

**Age and profit**: risk tolerance supposedly decreases with age 🡪 More consistently safe players would earn higher end capital 🡪 No significant correlation between age and session 2 end capital🡪 No evidence for more risk aversion with age 🡪 *Age spread in sample is minimal*

**6: Conclusions** - Participants learn to draw mainly from profitable decks 🡪They perform better in session 2 than 1

- Decisions to follow specific strategies **may** be influenced by somatic markers

- **Individual data: after huge loss, participant plays safe**

- Age doesn’t bring caution

**7: Perspective**

* **Cannon-Bard**: We react to a stimulus and experience the associated emotion at the same time.
* **James-Lange:** Stimulus 🡪 physiological reaction 🡪 Emotion
* **The Schacter-Singer**: 1st physiological arousal, but such reactions are often similar for different emotions. The physiological reactions must be cognitively labeled and interpreted as a particular emotion. The theory emphasizes the role that cognition and elements of the situation play in the experience of emotion.

- **Knowlton et al**.: Probabilistic weather prediction task -> Predict the weather from cues. Amnesic patients (hippocampus, no declarative memory of the task, but performance improved), Parkinson patients (basal ganglia, has declarative memory of the task, but no performance improvements).

**8: Grand perspective:** - **Encoding specificity principle** (Tulving): Context similarities between the encoding and recall situation will enhance recall-ability. Similarities might be external (time, place) or internal (emotions).

- **Tversky and Kahneman:** Somatic markers = loss aversion. You can “feel” the loss in your body, and you don’t want that. 🡪 Each choice can be framed in different ways, and thereby nudge our somatic markers in either direction.

**vmPFC:** Contains an index that couple knowledge to emotional/physiological states 🡪 Emotions can be activated by the same experience again (body loop) or through representation in insula and somatosensory cortex without actual physiological changes (as-if: allows prediction and taking action on stimuli before body change)