

## **Group 5: Project 2**

- 1) Implement the mood-dependent reinforcement learning model of Eldar & Niv (2015) and show that it can produce the mood-dependent choices observed experimentally.
- 2) Explore the parameter space to understand the conditions under which mood oscillations will emerge.
- 3) The model of Eldar & Niv assumes that recent positive prediction errors elevate mood and hence amplify rewards. However, other models (see Cools et al., 2010) assume that recent positive prediction errors increase a baseline or reference point that effectively diminishes perceived reward. In other words, when recent rewards are large, a given reward will appear less good compared to when recent rewards are small. How can the Eldar & Niv model be modified to account for this? How does the reference point interact with mood dynamics? What are the implications for choice perseveration and switching?
- 4) Discuss how this model might be used to understand mood disorders (see Eldar et al., 2016).

### **References:**

- Cools, R., Nakamura, K., & Daw, N.D. (2011). Serotonin and dopamine: unifying affective, activational, and decision functions. *Neuropsychopharmacology*, *36*, 98-113.
- Eldar, E., & Niv, Y. (2015). Interaction between emotional state and learning underlies mood instability. *Nature Communications*, *6*, 6149.
- Eldar, E., Rutledge, R.B., Dolan, R.J., & Niv, Y. (2016). Mood as representation of momentum. *Trends in Cognitive Sciences*, *20*, 15-24.