Major depressive disorder is associated with blunted learning signals in medial prefrontal cortex and putamen when seeking monetary reward

**Introduction**

- Major depressive disorder (MDD) is characterized by debilitating motivational and affective symptoms, such as anhedonia and social withdrawal.
- Such motivational symptoms may be related to atypical learning processes that link predictive cues with reinforcing outcomes.
- There is debate over whether depression and these symptoms are associated with a striatal reward deficit, and whether temporal stage (anticipation v. experience of reinforcement) and context may occur.
- To address this, we examined a dopamine-mediated learning signal (prediction error) using a multi-stage reinforcement learning task never before examined in depression.
- We hypothesized that blunted learning signal responses in the cortico-striatal pathway would be associated with MDD and motivation-related symptoms.

**Methods**

- 23 medication-naïve patients with MDD and 24 demographically matched comparison volunteers completed two phases of a probabilistic learning task (above) of 60 trials of separate, counterbalanced conditions during scanning.
- In the gain condition (3 runs), subjects were instructed to earn as much money from an endowment.
- Participants from this sample also participated in additional reward learning testing (see poster by Whitton et al- M83) and PET imaging related to predictors of response to pramipexole treatment (see poster by Schneider et al- W109).
- Scanning took place at the New York State Psychiatric Institute on a 3T scanner (Functional: Whole brain, echo gradient, FOV 19.2, Slice thickness = 3, TR = 28ms, TE = 28ms, 77 degree flip angle, 42 slices, 178 volumes)