Presentation Abstract

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Presentation Title: Integration of reward and inhibition under uncertainty and incentive driven outcomes

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Abstract: Our everyday interactions require the selection among a variety of choices. We make these decisions based on our values, in order to maximize the benefits of the outcome. Problem gamblers (PG’s) and those with orbitofrontal (OFC) damage act out based on their impulsive urges that could lead to inappropriate choices and ultimately to the wrong outcomes. In the anti-saccade task, an inhibitory mechanism is exerted to suppress a visually guided saccade to the stimulus (i.e. pro-saccade). The suppression of such a visual reflex, orienting, and instead making a purposeful saccade to the opposite direction is expected to be more difficult when confronted with more meaningful stimuli. In this study we set out to measure response latency, error rates and to compare the strategies undertaken by risk-seeking and risk-aversive individuals in a probability-based choice paradigm. Neutral faces and images of money were designed to cause
interference as the participants were asked to perform anti- and pro-saccades by looking and pressing the keyboard button in the direction of their saccades (i.e. left/right). Each trial was associated with either a monetary reward (or loss) that was calculated based on performance accuracy, type of saccade, probability and intensity of payout. We hypothesize that the images of money will cause more interference for risk-taking individuals (i.e. gamblers) whereas faces will have that same effect with risk-averse and risk-neutral participants. Hence, a different pattern of behaviour is expected to arise from this paradigm given each individual’s tolerance for risk. In comparing the anti trials with pro trials, the correct performance of the pro trials yielded faster reaction times (RT) than that of correct anti trials (P<0.01). Additionally, we found that when the intensity of payout was low, correct pro trials were performed faster than correct anti trials (P<0.01). This finding was unexpected as the payout associated with anti trials was always higher than pro regardless of intensity. It was also observed that lower probability of payout elicited faster performance, specifically when comparing trials with 25% probability of payout to those with 50% probability of payout (P<0.05). Our goal is to examine the neural structures involved using functional magnetic resonance imaging (fMRI) in order to examine the pattern of activity in the prefrontal regions as well as in the striatum. We predict that the neural activity in these regions will be determined by each individual’s risk behaviour as well as reward uncertainty.

Disclosures:  
S. Ovaysikia: Employment; York University, Centre for Vision Research, Department of Psychology, Neuroscience Graduate Diploma Program. Research Grant; Ontatio Problem Gambling Research Centre (OPGRC), Natural Sciences and Engineering Reseach Council (NSERC). L.K. Pynn: Employment; York University, Department of Psychology, Centre for Vision Research, Neuroscience Graduate Diploma Program. K. DeSimone: Employment; York University, Department of Psychology, Centre for Vision Research, Neuroscience Graduate Diploma Program. J.F.X. DeSouza: Employment; York University, Department of Psychology, Centre for Vision Research, Neuroscience Graduate Diploma Program.
PREFRONTAL CORTEX

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