## Behavioral Economics

Mark Dean

Homework 3

## **Due** Weds 21st Dec

- Question 1 (Rational Inattention Revisited) We discussed in class how a recurring feature of perception is that people and animals seem to allocate their perceptual resources based on prior beliefs - with more attention paid to states of the world which are more likely to occur. We also discussed how Mike's work showed that this feature didn't come about naturally from a cost function based on Shannon Mutual Information
  - 1. So you understand Mike's result, I want you to recreate it in a simplified setting. Consider an experiment in which a light is going to come on either at a left hand or right hand location (with probabilities  $\mu$  and  $(1 - \mu)$  respectively). The light can be either red or green with equal probability/ You get \$1 if you correctly report the color of the light, but you pay attention costs. Show that, if costs are based on Shannon Mutual information then the optimal solution is not a function of  $\mu$ , but if costs are based on Shannon Capacity then it is.
  - 2. Ganguli and Simoncelli [2012] have a paper which considers a similar idea. Have a read of it (its on the website), and explain how their approach differs from Mike's.
- Question 2 (Context Dependence) In class I presented three models of context dependence: "Normalization is a general neural mechanism for context-dependent decision making" By Louie et al. [2013], "Salience Theory of Choice Under Risk" by Bordalo et al [2012] and "A Model of Relative Thinking" by Bushong et al. [2015]
  - 1. Take a look at the data presented in "A Range-Normalization Model of Context-Dependent

Choice: A New Model and Evidence" by Soltaini et al. [2012]. Is it consistent with the relative thinking model?

- 2. Describe an experiment that would allow you to test between the salience and relative thinking models. Be very clear about what it is that you are assuming is observable.
- 3. See if you can come up with a version of the relative thinking model that could be applied to the type of data set used in the Louie et al [2013] paper. Would their data support or violate your version of the range normalization model?