CHOICE UNDER UNCERTAINTY: VIOLATION OF OPTIMALITY IN DECISION MAKING

Kathleen Rodenburg

ABSTRACT:

The question as to how people judge the probabilities or likelihoods of uncertain events has been a major focus in behavioral decision research for a number of years. The fact that intuitive judgments often deviate from the laws of probability are widely accepted (Harrison & al. 2010, Holt & Smith 2009, Von Witherfeldt & Edwards 1986). However, controversy still exists surrounding both the identification and root cause of systematic deviations from optimal behaviour. In part 1 of this thesis, an investigative study is conducted with the intent to sharpen the view to literature concerning corresponding psychology and economics experiments designed to test decision tasks that involve purchasing and observing information from an imperfect message prior to taking a terminal action choice. This investigative study identifies areas of research that warrant further investigation as well as provides enhancements for execution in the subsequent experiment conducted in Part 2 & 3 of this thesis. In Part 2 & 3, I conduct an experiment, using the enhancements in experimental design identified in the investigative study of Part 1, to test how subjects behave in an individual binary choice decision task with the option to purchase or observe for free additional information before reaching a final decision. I find that subjects' behaviour over time converges toward optimal decisions prior to observing an imperfect information signal. However, when subjects observe an imperfect information signal prior to their terminal choice there is greater deviation from optimal behaviour. I find in addition to behaviour that is reflective of a risk-neutral BEU maximizer, status quo bias, over-weighing the informational value of the message received and past statistically independent outcomes influencing future choices. The subjects' willingness to pay (WTP) to use the additional information gathered from an imperfect message service when making a final decision was on average less than the risk neutral BEU willingness to pay benchmark. Moreover, as the informative value of the message increased, causing the BEU valuation to increase, subjects under-estimated the value of the message signal to a greater degree. Although risk attitudes may have influenced the subjects' WTP decisions, it does not account for the increased conservative WTP behaviour when information became more valuable. Charness & Levin (2005) suggested that subjects use different decision heuristics (i.e., reinforcement learning) when decision environments are more complicated, in particular when faced with harder updating tasks. To test this proposition, a sub-set of subjects when presented with an imperfect information signal were provided with the Bayes law calculation. These subjects performed no better relative to optimal decision theory than the subjects who were only provided with the parameter values necessary to calculate Bayes law. Additionally, the findings from this study suggest that individuals adopt different decision rules depending on both personal attributes (i.e. skillset, gender, experience) and on the context and environment in which the decision task is conducted.