

The presentation will be built on the empirical findings in the following two recently published papers.

ZHONG Songfa, Salomon ISRAEL, XUE Hong, SHAM Pak Chung, Richard P EBSTEIN, CHEW Soo Hong. "[A Neurochemical Approach to Valuation Sensitivity over Gains and Losses.](#)" Proceedings of the Royal Society B: Biological Sciences, 2009 276:4181-4188.

*Abstract*

Prospect theory proposes the hypothesis that people have diminishing sensitivity in valuing increases in the size of monetary outcomes, for both gains and losses. For decision-making under risk, this implies a tendency to be risk-tolerant over losses while being generally risk averse over gains. We offer a neurochemistry-based model of the diminishing valuation sensitivity hypothesis. Specifically, we propose that dopamine tone modulates the sensitivity towards valuation of gains while serotonin tone modulates the sensitivity towards valuation of losses. Consequently, higher dopamine tone would yield a more concave valuation function over gains while higher serotonin tone would yield a more convex valuation function over losses. Using a neurogenetics strategy to test our neurochemical model, we find that subjects with the 9-repeat allele of DAT1 (lower DA tone) are more risk-tolerant over gains than subjects with the 10-repeat allele, and that subjects with the 10-repeat allele of STin2 (higher 5HT tone) are more risk-tolerant over losses than subjects with the 12-repeat allele. Overall, our results support the implications of our model and provide the first neurogenetics evidence that risk attitudes are partially hard-wired in differentiating between gain- and loss-oriented risks.

ZHONG Songfa, Salomon ISRAEL, XUE Hong, Richard P EBSTEIN, CHEW Soo Hong. "[Monoamine Oxidase A Gene \(MAOA\) Associated with Attitude towards Longshot Risks.](#)" PLoS ONE, 2009 4(12): e8516.

*Abstract*

Decision making often entails longshot risks involving a small chance of receiving a substantial outcome. People tend to be risk preferring (averse) when facing longshot risks involving significant gains (losses). This differentiation towards longshot risks underpins the markets for lottery as well as for insurance. Both lottery and insurance have emerged since ancient times and continue to play a useful role in the modern economy. In this study, we observe subjects' incentivized choices in a controlled laboratory setting, and investigate their association with a widely studied, promoter-region repeat functional polymorphism in monoamine oxidase A gene (*MAOA*). We find that subjects with the high activity (4-repeat) allele are characterized by a preference for the longshot lottery and also less insurance purchasing than subjects with the low activity (3-repeat) allele. This is the first result to link attitude towards longshot risks to a specific gene. It complements recent findings on the neurobiological basis of economic risk taking.