

Familiarity Breeds Risk Affinity: GABAergic Modulation of Neural Response to Familiarity Bias

Chew Soo Hong

Abstract

In behavioral economics, people display a paradoxical behavior called familiarity bias if their propensity to take risk increases with how familiar they are with the underlying uncertainty. Based on the observation that uncertainty induces anxiety, we hypothesize that familiarity offers a mental mechanism to ameliorate anxiety and ipso facto risk aversion. Building on psychopharmacology studies demonstrating the effect of GABA agonists, e.g., diazepam anxiolytics acting on GABAA, on both anxiety and risk taking, we further hypothesize that individual differences in familiarity bias may be explained by changes in GABAergic pathways. We test this hypothesis across two studies. First, we study ten SNPs of GABRB2, a gene for GABAA receptors, and find seven of them each showing a negative association between familiarity bias and the presence of its minor allele. Further analysis of genetic load reveals an overall negative relation between familiarity bias and the instances of the minor allele being present at each of these seven SNPs. Subsequently, we recruit a subsample of 40 subjects for an imaging study using rs1816072 which has the most balanced allelic distribution of the seven SNPs. Besides replicating the dependence of familiarity bias on rs1816072, we find that activation in the right amygdala correlates with individual levels of familiarity bias and is, notably, higher among participants who are homozygous major. Taken together, we have identified a biological mechanism linking a gene in the GABAergic pathway, neural activations particularly in the amygdala, and the degree of familiarity bias in decision making under uncertainty.