Translational approach of decision making under conditions of rare and extreme events

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Résumé

Uncertainty is a very important part of life and has been widely studied in neuroscience and economics. However, we still know very little about how human and other animals cope with very rare (frequency around 1%) but extreme (strong consequences) events (REEs). What happens when we face events that are both rare (which occurrence cannot be predicted, too surprising) and extreme in their consequences (positive, Jackpot JP - or negative, Black Swan BS) ? How do we respond to such events? To explore these questions, our study, in humans and rats, employs a four-armed bandit task with exposure to stochastic gains and losses, some of which are exceptionally REEs. Previous research highlighted rats' sensitivity to REEs, with two main strategies: total BS avoidance and partial JP seeking. In this study, we introduce two related tasks for humans, differing in their entry method: one through experience and the other through a partial description of outcomes. Our findings show that humans have similar strategies as found in rats: they strongly avoid BS and partially seek JP, indicating that humans treat differently positive and negative REE, with individual differences in the strength of these strategies. Participants employ similar strategies or reactions to cope with REEs in the two tasks. Individuals exhibiting differences in decision-making phenotypes and sensitivity have also different exposures and reactions to REEs.

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