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Impulsive decision-making: Findings from the modelling of 3 versions of the Iowa Gambling Task

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The Iowa Gambling Task (IGT) is a popular method for investigating decision-making. In its original version, participants make 100 choices from four decks of cards (Bechara et al., 1994). Each choice is followed by a gain and/or a loss of money. The goal is to maximize the net payoff across the successive trials. Two decks are advantageous but their positions are unknown to the participant. Choices in this version have been modelled by means of a reinforcement learning algorithm that decomposes decision-making into 3 parameters: a learning rate, a sensitivity to reward, and an exploration tendency (Busemeyer & Stout, 2002). However this modelling is problematic because simulations have shown that the estimated parameters are unreliable with only 100 trials. To overcome this limitation, we used 3 versions of the IGT with 100 trials each. The 2 advantageous decks changed between versions. Simulations revealed that a modelling based on the 3 versions allowed a more precise estimation of the parameters. As an application, we modelled choices of adults who completed the 3 IGT versions successively and the UPPS impulsivity questionnaire. The 3 parameters were estimated for each participant and correlated with their score of impulsivity. Results revealed that the sensitivity to reward parameter correlated with one aspect of impulsivity: the tendency to act without thinking (lack of premeditation). It is concluded that repeated measurement on the IGT improves the modelling of decision-making and that lack of premeditation is related to higher sensitivity to reward on the IGT.