Neuroeconomics

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The neural process of decision making is not easily accessible to direct experimental manipulations and hence requires careful theoretical analyses. Nevertheless, neurobiological studies of decision making started exploiting the frameworks previously developed in economics and psychology. This cross-disciplinary research program, known as neuroeconomics, has already been enormously successful.

The articles included in this E-book are eclectic samples of the latest research on various topics in neuroeconomics. Many of these papers address the issues related to, utility functions. For example, Heldman et al. (2009) demonstrated that a combination of electroencephalographic recording and economic choice paradigms can be a useful research tool to examine the neural basis of utility function. Hwang et al. (2009) provided quantitative characterization of temporal discount function in non-human primates, whereas Luhman (2009) provides a review of behavioral and neurobiological studies on temporal discounting and intertemporal choice. Activity in the posterior parietal cortex, such as the lateral intraparietal cortex (LIP), encodes the signals related to utilities during decision making, and Pearson et al. (2010) provides a parsimonious model for the numerical coding in the LIP. Carter et al. (2009) have used functional neuroimaging to examine the neural activity related to monetary gains and losses directed to self and charity. Salamone et al. (2009) discuss the role of the dopamine neurons in effort-related choice behavior, whereas Delgado et al. (2009) demonstrated that the interaction between amygdala and striatum plays an important role during avoidance learning in human subjects.

Other papers in this collection focus on the neural basis of social decision making. Thevarajah et al. (2010) demonstrated that during a computer-simulated matching-pennies game, the behaviors of monkeys and the neural activity in the superior colliculus were parsimoniously accounted for by a hybrid learning model. Chang and Sanfey (2009) showed that the memory of partners encountered previously during an ultimatum game and the associated neural activity in many different brain areas were enhanced when the previous offers from these partners were contradictory to the initial expectations. Seymour et al. (2009) proposed that a combination of reinforcement learning and observation learning might give rise to altruistic behavior. Aragona and Wang (2009) showed that the prairie voles' monogamous pair bonding might be a model system for understanding the role of reward and hedonic mechanisms underlying social decision making. Finally, Kato et al. (2009) investigated the neural mechanisms mediating the effects of positive and negative advertisement on political preferences. This excellent collection of articles demonstrate that the insights from neuroeconomic studies have the potential to shed light on many topics in humanities and social sciences.

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