

Shelling and the Brain: Testing Concepts of Rationality Using the Neuroeconomics Approach

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Neoclassical economics traditionally considers decision making processes as the result of rational maximisation processes. It implies that individuals are supposed to be able to react to each situation by a behavior motivated by a conscious calculation of advantages.

Thomas C. Schelling (1960, 1984, 2006) points out that the assumption of rational behavior in analysing actual behavior should be either a good approximation of reality or a caricature (Schelling, 1960, p.4). This is the risk that any abstraction runs. It doesn't imply that Schelling explicitly rejected the perfect rationality assumption. He rather focused his attention on the relevance of deviations from perfect rationality in determining individual actual behavior (Schelling, 1984, 2006, Aydionat, 2005). Only the analysis of those deviations, in fact, enables to better understand the possible use and the limits of the rational choice approach.

The subject of complexity of individual decision processes is one of the topics Schelling worked on all along his career. Dealing with his work, in fact, it is possible to find out a more complex idea of human rationality.

Starting from his *Strategy of Conflict* (1960) and continuing with his later studies on substance abuse and habitual behavior (1984), until his last *Strategy of Commitment* (2006), it seems possible to outline an evolving concept of rationality. Individual rationality is described as a *collection of attributes* and individuals are considered as involved in two different levels of strategic interaction: the first taking place inside the individuals, among the different selves people seems to embody, and the second referring to social interaction.

Here we show how recent results from neuroeconomics studies support Schelling's main theoretical ideas. Evidence from neuroimaging experiments demonstrated how the 'two selves' model is a good predictor of subjects' behaviour in many interactive and individual decision making contexts, such as the ultimatum game (Sanfey et al., *Science*, 2003) and tasks of intertemporal discounting (McClure et al., *Science*, 2004). The same brain substrates (e.g. the orbitofrontal cortex) are involved in processing the same level of complexity in analogous individual and social contexts.