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Heredity in Evolution & Evolution of Heredity

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The inheritance of characteristics induced by the environment has often been opposed to the theory of evolution by natural selection. However, although evolution by natural selection requires new heritable traits to be produced and transmitted, it does not prescribe, *per se*, the mechanisms by which this is operated. The mechanisms of inheritance are not, however, unconstrained, because they are themselves subject to natural selection. We introduce a schematic, analytically solvable mathematical model to compare the adaptive value of different schemes of inheritance. Our model allows for variations to be inherited, randomly produced, or environmentally induced, and, irrespectively, to be either transmitted or not during reproduction. The adaptation of the different schemes for processing variations is quantified for a range of fluctuating environments, following an approach that links quantitative genetics with stochastic control theory.