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Towards an Extended Evolutionary Synthesis

Since the last major conceptual integration in evolutionary biology - the Modern Synthesis of the 1940s - the biosciences have made significant advances. The rise of molecular biology and evolutionary developmental biology, the recognition of ecological development, niche construction and of multiple inheritance systems, the -omics revolution and the science of systems biology, among other developments, have provided a wealth of new knowledge regarding the mechanisms of evolutionary change. Some of these results are in agreement with the classical synthesis theory and others require conceptual expansion. An extended evolutionary synthesis has the potential to unite pertinent concepts emerging from these novel fields with elements from the standard theory, but it differs from the latter in some of its core tenets and predictive capacities. Whereas the synthesis theory had concentrated on genes and adaptive variation in populations, the extended framework emphasizes the role of constructive processes and systems dynamics in the evolution of organismal complexity.

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