

Since 2000 there is an important debate about what "natural selection" and "drift" mean in the current theory of evolution. Do they name causes of evolution, as is usually thought, or simply statistical effects, ie. types of populational outcomes? A central issue in this debate is whether or not it makes sense to conceive of natural selection and drift as causes operating at a populational level. Forber and Reisman argue in two recent articles that one can use the manipulability theory of causation to show that natural selection and drift are high-level causes of evolutionary change, discernible only at a population level of analysis. I contend that they are wrong. If the manipulability criterion of causation can be used, as they say, to show that some high-level variables are causal, it is however not sufficient to establish how directly such variables are involved in producing the phenomenon. I argue that because of the stochastic nature of biological evolution, the question of whether a determinate evolution is *due* to natural selection or to drift cannot be answered by considering only its starting point and its end point as they suppose, even if these points can be specified as precisely as one will. Following Roberta Millstein, I claim that "selection" and "drift" can refer to causes of evolution only if they are used to distinguish between the different processes that may lead from a starting point to a end point. Now, because of the role chance plays in evolution, the process by which population P0 at t0, say, may give rise to population P1 at t1 is not totally determined by the situation at t0. Two evolutions may have the same starting point and look identical when described at a populational level of analysis, and yet only one of them may be produced by what deserves to be called a selective process (the reproductive success of individuals bearing trait A, say, results from the causal role that having trait A played in various circumstances). I make clear how selective processes can, in fact, be distinguished from non selective ones by considering what happens at the level of individual histories. I explicate then what ambiguities are attached to the notion of a cause operating at a populational level. The whole analysis leads to the conclusion (1) that one needs to take into account the process or mechanism by which a determinate evolution is produced in order to tell whether or not it is due to selection or drift, and (2) that one should distinguish direct causation which occurs at the level of individual histories from the more indirect one that occurs at a population level and consists in increasing or decreasing the probability that a certain sort of process has a high impact. For instance, it appears confusing to say that the small size of the population produces drift. It would be more accurate to say that it increases the probability of drift processes having a high impact.