
Heredity without parents and offspring

Mathieu Charbonneau*¹

¹Konrad Lorez Institute for Evolution and Cognition Research (KLI) – Konrad Lorenz Institute for Evolution and Cognition Research Adolf Lorenz Gasse 2 A-3422, Altenberg, AUSTRIA, Austria

Abstract

Heredity, understood as a parent-offspring similarity relationship of some sort, is assumed to be a necessary condition for a population to undergo evolution by natural selection. Indeed, if parents with favourable traits did not transmit them to their offspring, natural selection would not cumulate adaptive changes. From this perspective, an inheritance system can be understood as a local mechanism insuring that offspring resemble their parents. This very general understanding of heredity is oft-claimed to be broad enough so that no specific form of inheritance mechanism be required for Darwinian evolution to obtain. Indeed, it seems to be opened to genetic, epigenetic, behavioral, cultural, symbiotic and cytoplasmic transmission. In this paper, I challenge the wide-spread assumption that for a process to serve as an inheritance system, it must establish a definite parent-offspring relationship. The assumption is not broad enough to include admissible cases of heredity such as some cases of ecological inheritance with diffused transmission. Rather, heredity should be understood at the level of the population system, that is, as a transgenerational process of retention of variation distribution amongst the parts of the population. An inheritance system would then be any mechanism insuring this population-level retention process. This construal of heredity allows a more inclusive notion of inheritance systems, with parent-offspring similarity being but a special case, and can unify the different inheritance systems through their common evolutionary role. It also has the potential to open new avenues of investigation in order to discover counter-intuitive forms of inheritance systems, both biological and extra-biological.

*Speaker