**Resumo do artigo de D. M. Fragaszy, D. Biro , Y. Eshchar, T. Humle, P. Izar, B. Resende and E. Visalberghi (2013)**

**“*The fourth dimension of tool use: temporally enduring artefacts aid primates learning to use tools*”**

In the first decade of this century, the study of tool use has been considered in relation to social learning and related to the definition of tradition in some non-human species. Therefore, to explain the development of tool use in animal species, evolutionary explanations have largely focused on the evolution of sociality and cognitive skills. The authors argue for the integration of a niche construction theory (NCT) in the theoretical framework, through which active and time persistent environmental changes resulting from behaviors participate in the development of tool use among individuals of a group. One of the environmental changes related to tool use under focus in the article is the production of artifacts that occur by modifying an object through its use, changing its location, shape, odor or appearance. The authors posit that the availability of artifacts in the environment participate in learning to use tools through repeated practice. They illustrate this view with their studies of bearded capuchin monkeys and chimpanzees. Bearded capuchin monkeys have been observed to crack oil-palm nuts with a hammer and an anvil in a Brazilian site. Youngsters learn the behavior after one year and are usually successful in oil-palm nut cracking at 2-3 years-old. They have been observed to handle artifacts and train significantly more near a previously used anvil, independently of concurrent activities by others. Regarding chimpanzees, they have been observed by the authors in the Bossou community in three different situations of tool use: nut-cracking, ant-dipping and pestle-pounding. In these different tool-use events, unweaned juveniles (0-5 years) are more tolerated around performing adults than weaned juveniles (5-10 years) or other adults and they have been seen to favor previously used tools compared to the other age groups. Most of the unweaned juvenile practice occurs with the mum and mum’s tools. Pestle-bounding of palm tree heart is unique to the Bossou community. Youngsters exclusively re-use tools before weaning, especially from the mother, and weaned young still re-use tools majoritarily. Basically, tool re-use in different contexts is more frequent when youngsters are honing their skills. Through their observations and analyzes, the authors suggest that provision of durable artifacts favor pertinent tool handling in youngsters, elicit interest in tool use and site and therefore participate in the development of technical expertise.

**Questões sobre o artigo de Jablonka, E. (2003).**

***“Systems of inheritance.”***

This article is very interesting and accounts for a more realistic and comprehensive view of inheritance. It integrates perspectives from biological sciences to social sciences passing through behavioral sciences and it appears that only such a broad and interdisciplinary view can fully represent the different ways of inheritance in nature. Not only the concept of inheritance would benefit from larger and crossed-field consideration but most of the concepts in the scientific field that are often considered under one light.

Here, Jablonka deals with different genetical concepts at first, which is considered as her area of expertise, but she later delves into different areas such as semantic, social learning and behaviors. It appears that she has an extended understanding of the various concepts and it makes me wonder if this extended and pluridisciplinary knowledge is a requirement for bringing together consideration from different scientific points of view? Would inter-individual collaboration be as effective in joining ideas?

A broad knowledge concentrated in a single individual would certainly be beneficial for the synthetical redaction and for having an interconnected view of concepts possibly generating new ideas. Yet, it can be considered as “the work of two persons in a single individual”, demanding possibly rare abilities for being an expert in far-related scientific fields. However, is the rarity of this multidisciplinary expertise due to intellectual capacities or structural limits? In other words, it appears that too few researchers are able to bridge knowledge between far-related areas but is this difficulty for specializing in more than a scientific field more related to the intellectual demands or to the lack of institutional support? This unique and very specific expertise of researchers, deterring them from understanding each other in their similar concepts between areas, may be due to the actual uni-direction of science. From a personal experience with a scientific formation, very seldom are the incentives to investigate and try to understand our field-specific knowledge from other research areas’ points of view.

Very specific and specialized knowledge is important for scientific advances, as much as it is important to relate to the knowledge we already have. An independent and individualistic research seems of little theoretical relevance and as we sometimes witness in the scientific literature, it can mislead research and narrow the scopes of analysis and understanding. In the article of Jablonka, the narrow and misleading concept has been to only consider the genetical inheritance mechanism and to generalize its process to all heredity, cultural or behavioral included. Compared to last centuries researchers debating on large, multidisciplinary and more general subjects, it appears that we now have more specialized researchers, in a great variety of fields, but who appear hardly aware of each other's discoveries and theoretical frameworks. Without articles such as the one of Jablonka, it makes me wonder if the different fields of science could not evolve in such different entities that they would reach a theoretical separation, rendering inconsistent, or sterile, the share of their specific knowledge. Different sciences would exist and they couldn't relate to each other. Would this be an acceptable evolution for science? Wouldn’t it be better to induce changes nowadays and try to stimulate the crossing of knowledge from different fields of science in researchers’ academic formation and professional production? So that we can keep on benefiting from different points of view and diverse subjects’ adaptation in order to build a richer understanding of the world. As Jablonka wrote: “The view of inheritance embodied in the replicator concept affects the way in which evolution is understood, [...]”. In other words, a limited concept to interpret larger mechanisms would give us a limited understanding of these mechanisms. The necessity of diversity in ideas for the survival of a scientific field appears as necessary as the diversity of genomic information for the survival of a population. Interestingly, to which extent can we apply the ecological concepts of genetics to science and knowledge? With a strict parallele, it would suggest that an optimal cross between scientific fields would occur with relatively close fields, generating a viable diversity and not with too far-related fields which could be too diverse and lead to unsuccessful reunion of ideas and concepts. Therefore, in order to bridge knowledge between far-related fields, one would have to be an expert in the in-between fields as well. It thus appears that the collaboration between individuals is necessary to successfully cover a great theoretical distance as it may be too demanding for a single individual. Besides, richer and stronger bridges may emerge from the diversity of inter-individual collaborations. Consequently, the individualistic research elicited by current scientific structural institutions may have to be modified in order to stimulate horizontal sharing.