Worksheet 2.1

Experiment in evolution with the silver fox

Dmitry Belyaev worked in Siberia with a group of silver foxes, studying the changes that may have led to the domestication of the dog. He suggested that tamability in foxes is a genetic trait with certain physical changes coming as a by-product. He proposed that the same processes he saw in his foxes could explain the domestication of the dog from the wolf (Trut, 1999).

Belyaev’s research began in 1959 with 30 male and 100 female foxes from a fur farm. A small percentage of the foxes were allowed to reproduce: the ones that passed a repeated test for tameness in which the experimenters offered food from their hands. After several generations of foxes, the research team found that the percentage of the fox population that passed the test was increasing dramatically, suggesting that the characteristic of tameness was being genetically passed on. From an original set of foxes with mostly hesitant responses to human contact, the foxes bred for more friendly behaviour eventually began competing with each other to gain human contact (Trut, 1999).

Other changes over the generations include slower development of the fear response (which is linked to a later rise in corticosteroid levels in the blood), lighter fur colour, floppier ears, shorter tails and legs. The researchers had created a simulated evolutionary context in which the behavioural characteristic of tamability offered an extreme survival advantage and, after several generations, they found that not only had the fox population developed their tamability, they also changed physically in ways that did not offer a direct survival advantage. Many of the physical changes noticed make specific fox features such as the tail, ears, and muzzle appear more juvenile (Trut, 1999). In addition, a social cognitive change has been observed in that later, domesticated generations of the foxes are significantly more likely to correctly locate hidden food by following a human’s pointing gesture than the undomesticated ones, something that many other animals are unable to do (Hare et al., 2005).

Trut (1999) notes that the research team believes the physical changes to be by-products of the genetic changes underlying the behavioural changes. More specifically, they observed that changes in the animals’ adrenal glands have reduced the likelihood of them entering a fight-or-flight state due to less corticosteroid release, and relatively higher serotonin levels among the more domesticated animals. These serotonin levels are thought to be responsible for the changes in the timing of the foxes’ development and may, therefore, be responsible for the retention of juvenile fox features into adulthood (Trut, 1999).
References


1 This research work has been cited frequently because of its important contribution to our understanding of genetics. What significance do you think it has for the study of human psychology?

2 How valid do you think it is to apply these results to humans?

3 Some researchers argue that human aggression and other forms of social interaction are likely to have a genetic basis, particularly relating to levels of serotonin. Consider your answers to the first two questions and explain how the silver fox research offers possible directions for further research to investigate the role of evolutionary and genetic factors.