

Study Questions Dealing with Genetic and Environmental Influences on Behavior

Ethology and Behavioral Ecology
Spring 2007

1. Explain why a given amount of genetic diversity (measured by heterozygosity at different loci and/or by allele frequencies) for different traits does not necessarily translate into similar amounts of phenotypic variation.
2. Does heritability (h^2 or H^2) identify genes responsible for a behavior or simply establish correlations? If the latter, what is (are) the correlation(s)?
3. Explain why "macro" traits, such as most behaviors, are far more influenced by environmental factors than say, the tertiary structure (and function) of a protein species. Does "environment" apply even to the structure of the protein? Explain. While you are at it, explain what is meant by "environment" in the most inclusive useful terms. Is everything that is external to the system of interest its environment in a biologically meaningful way? Explain. Are all factors in the environment equally important? Is the effect of the environment absolute -- i.e., independent of the genotype?
4. What is meant when someone says there is a gene for a particular phenotypic trait? Note: there are a number of answers to this, try to imagine as many as you can.
5. Should the heritability of learned behavioral traits be zero? Explain. How about species typical behaviors?
6. Discuss the nature-nurture conflict in reference to what you have learned about genetic influences on behavior.
7. Explain to a non-scientist friend of yours what it means to say that a behavior has a genetic component. Explain to this friend why traits are not "genetic" vs. "environmental".
8. Explain what could be called the "computational" model of the construction of phenotypic traits -- the traits are constructed by information from two general sources (name them). Invent or use a plausible scenario to illustrate your answer.