Alcock Ch. 3 - "The Development of Behavior"

Study Guide/Questions

Ethology and Behavioral Ecology

Please read all of Chapter 3 and try all of the discussion questions. *This assignment should take about 3 hours and can be done over two class period intervals.* The Summary at the end of the chapter is excellent and thought provoking – I would suggest reading it before the chapter and using the ideas there to guide your thought, along with the questions below, as you read the Chapter.

Introduction: This is a very important chapter in helping you to understand the complex feedback that occurs between the developing phenotype, genetic instructions and the environment. If you read this carefully and thoughtfully and relate it to lecture, you should gain a very good, non-naïve understanding of how behavior (and the phenotype) more broadly is "computed" during development.

1. The entire chapter centers on the *interactive theory of development*. Know what this theory is and keep it foremost in mind as you work through the chapter.
2. What do microarray data tell us about the mechanisms behind worker bee behavior? What is the role of environmental factors (and name some) in driving a change in gene expression during the lifetime of a worker bee? Can the time of expression of different genes be altered by a change in environmental conditions within a bee colony? Explain.
3. Be familiar with some of the examples of specific type of learning that different animals excel in. What is "preparing" the brain for specific type of learning? You may want to also refer to the white crowned sparrows of Ch. 2 in answering this question.
4. The "chocolate cake example" mentioned in discussion question 3.4 is just above discussion question 3.3. We also discuss it in class.
5. In Belding's ground squirrels, how are relatives recognized? Why can relatives still be recognized even if there has been no previous experience with them (albeit recognized less accurately and with more difficulty)? Why is self-recognition important in this system? Why should relatives have similar odors?
6. Be able to discuss what it means to have a single gene effect and know the three rodent examples (*fosB, Oxt & Trpc2*). Relate them to the handout on genetics that I gave on the website.
7. What is developmental homeostasis? What might it have to do with heritability in regard to the effects on phenotype of differences in environmental and genotypes within a population? Note the human examples and in particular, the famous experiments done by the Harlows.

8. We will discuss symmetry and its importance or not later in the course – but familiarize yourself with the issue in this Chapter.
9. What are polyphenisms? Here is a related term: what is phenotypic plasticity (look it up elsewhere)? How are they related? The concept of polyphenism will be discussed later several times – in particular when we discuss alternative behavioral strategies.
10. When is learning adaptive? Why should learning be seen as under the influence of selection? How does cost/benefit come into this discussion? This short section is one of the most important parts of the chapter.
11. A comment on Discussion Question 3.14. Know the difference between a hypothesis e.g., one regarding learning differences and a just-so story (mentioned earlier in class).
12. Additional results from Garcia's experiments, beyond those given in class, are presented on page 102-3. Study this section carefully.
13. The Summary at the end of the Chapter is excellent and thought provoking (repeated from above).