Tuesday Lecture Notes

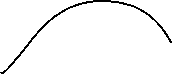
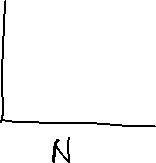
2024-09-03

**Animal behavior and habitat selection**

Quiz: Components of habitat definition as provided by Hall *et al.* 1997:

* **Organism/species specific**
* **Resources**
* **Conditions/risks**
* **Area**
* **Occupancy/residency/exists**
* **Survival and reproduction (positive fitness)**

How do we as researchers know what those resources/conditions are that allow an organism to persist in an area? Northrup et al. 2021, Ecosphere: *A* ***point in environmental space****, defined by a set of* ***conditions, resources and risks*** *for the* ***species of interest****. Although habitat is approximated by the set of environmental covariates measured in an analysis, the full suite of* ***conditions resources and risks*** *for a species are rarely known or measured. Furthermore, the specific relationship between habitat and the fitness of an animal is* ***density dependent****.*



Density dependent

**Behavior**: *A response to a stimuli*

Why do animals respond the way they do to stimuli?

A black and white paper with text

Description automatically generated *(Alcock, 1998, p. 6) proximate versus ultimate questions*

* **Ultimate** reasons for behavior: due to evolutionary processes.
  + The *why* evolutionary questions
  + What is the adaptive value of this behavior?
* **Proximate** reasons for behavior: mechanism within the organism.
  + The *how* questions of mechanisms
  + What needs to happen for this behavior to occur?
  + Physiological processes, genetic development, sensory systems

Are behaviors always appropriate to a given stimulus?

No, example of armadillos jumping straight up when approached by a predator, but they also exhibit this behavior when a car approaches them while crossing the road. This leads them to getting hit by the cars, when they may have just passed over them if they had not jumped.

Maladaptive response:

Sign stimuli: Some feature of a stimulus that is sufficient to bring about a particular pattern of behavior.

Open vs closed genetic programs (**find in Mayr, 1974**): does the system allow for additional input of information?

**On a continuum because we are thinking about it in the context of habitat selection, therefore several stimuli that are being responded to by several behavioral processes.**



Closed Open

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| --- | --- |
| Example: Brown headed cow birds. Grows up with a foster species, yet when it fledges, it will associate with cow birds, mate, find a new nest to parasitize. Has never seen another cowbird, but knows what to look for and how to respond. | Opportunity for the additional information from the environment to influence that behavior.  Parent teaching offspring.  How you exhibit the genetic behavior can be modified by information that is learned. |

In the context of habitat selection: example of amphibians, need specific temperature and moisture ranges, needs food – must recognize the stimuli in the environment to hunt, must recognize risk to survive, this is a species that was mother laid eggs and left, no chance for learning.

Behavioral response to sign stimuli to determine preferred temp range, is likely going to be very closed.

A risk of getting it wrong in closed genetic program could be a complete loss of fitness.

**The stimluli with greatest fitnesss consequences are closed because nat selection has honed in on these to cause an animal to behave in a way that will enable it to persist in the environment.**