

Honors Seminar 259 — cheat sheet for 12/3/2008 — Andrew Baker

Barton & Harvey (2000)

You should read all of the whole article except for the “Methods” section. Key questions:

1. What does “mosaic evolution” mean in the context of this article?
2. What earlier hypothesis about mammalian brain evolution is this paper aiming to disprove?
3. Why don't the three lines in Figure 1 all fall on top of each other?
4. What's the significance of the thick lines in Figure 3?
5. Why are the boxes along the diagonal in Figure 4 special, and why are they the ones with more asterisks beside their entries? (Note that these are in fact two different questions.)

Key terms:

- **allometric** = adjective describing any scaling relation between two properties of living organisms (typically, a relationship that is linear, in the sense that $y \propto x^\alpha$ with $\alpha = 1$)
- **cerebellum** = low-level portion of the brain that is partly responsible for sensory perception and muscular control
- **covariation** = correlated variation between two parameters
- **diencephalon** = portion of the brain that includes the thalamus and the hypothalamus; together with the telencephalon, this comprises the highest-level “forebrain”
- **haplorhine** = a member of the sub-order of primates that includes monkeys, apes, and humans
- **hyper-allometric** = an allometric relationship between two properties with $y \propto x^\alpha$ for $\alpha > 1$)
- **limbic system** = assortment of brain structures that comprise the lowest level of the cortex and are partly responsible for emotion and memory
- **medulla [oblongata]** = lower portion of the brain stem that controls basic functions such as breathing, blood pressure, and heart rate
- **mesencephalon** = brain structure sandwiched between the diencephalon and the cerebellum, which originated at the early stages of vertebrate evolution
- **neocortex** = a particular tissue within the cerebral cortex (the outer layer of the cerebrum), which in humans constitutes the bulk of the cerebral cortex
- **olfactory bulb** = portion of the brain that is partly responsible for the sense of smell

- **P** = the probability that a correlation just as strong as one observed could be found in a random distribution of data (the lower the value, the more likely is that a correlation is real)
- **strepsirhine** = a member of the sub-order of primates that includes lemurs and lorises
- **telencephalon** = the cerebral cortex and the basal ganglia, which together with the diencephalon comprise the highest-level “forebrain”