Why childhood is so long[1,2]

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The appealing aspect of this treatise on human growth is the attention given to evolutionary issues. Although this section is done poorly, it considers relevant issues and debates in a way that will surely stimulate others to collect more data or reanalyze existing data in search of better understanding. We are so often accustomed to thinking of humans as unique that we perhaps unconciously magnify the differences we find between the biology of ourselves and that of other mammals. Bogin justifies his recognition of a unique feature of human growth — a childhood period of slow growth followed by an adolescent spurt of much higher growth- by deemphasizing or attacking the adequacy of analysis of the few studies he included on postnatal growth of nonhuman primates and a few other mammals. He may be right that other mammals lack the sharp and relatively large growth spurt seen in humans, but by denying the similarity and emphasizing the difference, he may have been led to the wrong answer. For example, the slower growth during childhood is taken to indicate a lower expenditure of energy and thus a lower demand for food. He fails to consider that childhood consumption continues to increase with age, and that at all ages energy used for growth is only a small proportion of that assimulated from food. For this reason alone, Bogin's arguments (p. 75) for the addition of a long childhood period of slow growth to human ontogeny make little functional sense because the food demands of a slow- or fast-growing child are hardly different.

In addition to maintaining body temperature, much energy is expended in active play, which aids in the growing coordination of the nervous system. While the brain is growing, its complexity is aided by active use — the more diversified the activities the better for the richness of interconnections and thus presumably for intelligence of the adult. The growth of the body roughly tends to parallel that of the brain, so that as the brain slows down toward a halt roughly between ages 6 and 12, so does general body growth slow down (see Figure 2.13). This slower body growth may be necessary for establishing the proper nerve-muscle connections and coordination which may be more difficult to achieve when body growth is outpacing brain growth.

The reason why the brain merely slows down drastically rather than simply stops growing once full size is reached is not apparent. Possibly maintaining some growth enables new connections to be formed during this period of enhanced learning and physical coordination. Alternatively, if cessation of brain growth triggers puberty, the

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[1]**Patterns of Human Growth.**
Barry Bogin. 1988. Cambridge Univ. Press. viii + 267 pp. Apparently acid paper. ISBN 0-521-34593-6 hardbound, $54.50; -34690-8 softbound, $18.00 (minus 5 cents).

[2]Contribution 108, Lothlorien Laboratory of Evolutionary Biology.
Evolutionary Theory 10: 83-84 (December, 1991).

period of slow growth after a rapid growth to near adult size may relate to a need for time to develop the rich interconnections that are essential to intelligence.

In most mammals, sexual maturity occurs about the time that the brain ceases to grow, and age at puberty is more highly correlated with brain mass than with body mass. The delayed maturity seen in humans appears to be simply a consequence of having a larger brain than apes rather than a delay needed to acquire complex culture. At about 6 years of age a noticeable decrease in the rate of brain growth is usually followed by a small but noticeable spurt It is possible that both the mid-childhood and adolescent growth spurts are somehow causally linked to changes in the rate of brain growth. Since puberty in other mammals also tends to occur shortly after the brain has reached adult size, the faster growth at puberty may function to get the individual to adult size as quickly as possible before the onset of actual reproduction with its large demand on available energy. In nonhuman primates, the adolescent growth spurt of males is often at least as impressive as that of humans, because it is advantageous for males to be larger to compete for females, which often find it advantageous to remain smaller.

When the growth curves of humans are averaged for a large population, the large, sharp individual peaks are lost in a lower and wider average peak. Individual records for monkeys and apes have not been readily available, but a recent study on the rhesus monkey establishes pubertal growth spurts in several length measurements at least as dramatic as those seen in humans (J.M. Tanner et al. 1990. Amer. Jour. Human Biol. 2: 101), It is time we establish an adequate comparative data base for investigating the phenomenon of mammalian growth in a way that will allow us to pursue the types of evolutionary issues that Bogin outlines in this stimulating book. In particular, the correlations suggested among brain and body growth and puberty bear more intensive study.