A point in child development known as adrenarche—the beginning of adrenal androgen activity—may represent the beginning of the process of puberty. Two University of Chicago researchers, Dr. Martha K. McClintock and Dr. Gilbert Herdt, believe that puberty is triggered by dihydroepiandrosterone (DHEA), a hormone produced by the adrenal glands. According to data the two gathered from three separate studies, DHEA levels begin to increase at around the age of six and reach a critical level around age ten. The researchers characterize these hormonal changes as triggering a number of cognitive, emotional, and social changes in around fourth or fifth grade. Students in these grades begin to engage in boy-girl teasing, exhibit a significant increase in abstract reasoning skills, and experience vulnerability to embarrassment. The three studies also gathered data on subjects’ (who were mostly in their mid 30s) first recollected feelings of sexual attraction. The mean age reported by the subjects was around 10 or 11. This finding has led the researchers to postulate that sexual development moves along a continuum, beginning with attraction, progressing to desire, and leading to the willingness and readiness to act on the desire. McClintock, quoted in the New York Times, noted: “Our culture regards middle childhood as a time of hormonal quiescence. Freud called it ‘latency.’ But actually a great deal of activity is going on.”

least a year after menarche young women’s fertility levels are very low, and they are prone to spontaneous abortions if they do conceive.

In boys, as in girls, the first outward sign of sexual maturation is often light-colored pubic hair around the time the growth spurt begins. The testes and scrotum begin to grow, and the scrotum darkens, thickens, and becomes pendulous. About a year after the testes begin to increase in size, the penis lengthens and widens, taking several years to reach its full size. Sperm production increases, and ejaculations—the male counterpart to menarche in girls—begin, occurring through nocturnal emission, masturbation, or sexual intercourse. (It takes from one to three years until ejaculations contain enough sperm for a boy to be really fertile.) Boys’ pubic hair, like that of girls, gradually becomes thicker and curlier and covers a wider area, and facial hair appears, first in the mustache area above the upper lip and later at the sides of the face and on the chin. As a boy’s larynx grows and the vocal cords lengthen, his voice drops (roughly an octave in pitch) and changes in quality. Although girls’ voices also become lower, the change is more dramatic (and less controlled) in boys, whose voices occasionally break, producing an embarrassing high-pitched squeak.

The sequence and age range of the developmental changes associated with puberty can vary widely. Although most children begin puberty between the ages of 10 and 12, it can start at any age from 8 to 16. The most obvious determining factor is gender; on average, puberty arrives earlier for girls than boys. Heredity also appears to play an important role. Compared to an overall age range of nine to 18 for menarche, the age difference for sisters averages only 13 months and for identical twins, less than three months. Body weight is a factor as well: puberty often begins earlier in heavier children of both sexes and later in thinner ones. The onset of menstruation, in particular, appears to be related to amounts of body fat. Girls with little body fat, especially athletes, often start menstruating at a later-than-average age. Over the past 100 years, puberty has tended to begin increasingly early in both sexes (a phenomenon called the secular trend). In 1997, the results of a study led by Dr. Marcia E. Herman-Giddens of the University of North Carolina at Chapel Hill School of Public Health provided evidence that the average age of menarche was declining. Instead of occurring between the ages of 12 and 14, as is typical in the late 1990s, girls’ first menstrual periods commonly appeared between the ages of 15 and 17 in the 19th century. Puberty in boys usually didn’t begin until the ages of 15 or 16 (in the late 18th and early 19th centuries, boy sopranos in their mid-to-late teens still sang in church choirs). Explanations for this pattern have ranged from evolution to better health, especially as a consequence of improved nutrition.

An important aspect of puberty is the development of body image. Teenagers are often critical of their bodies during this period, either because they feel they are maturing too early or too late, or because they fail to match the stereotyped ideals of attractiveness for their sex (i.e., tall and muscular for men, fashionably thin for women). Girls who mature early have a hard time initially because they feel self-conscious and isolated, but they adjust well and even gain in status once their peers begin to catch up. Some research even suggests that girls who mature early may ultimately be better off than those who mature late because the turmoil of their early teenage years helps them develop coping skills that stand them in good stead later on. For boys, the relative positions of early and late maturers is reversed. Those who are already tall and athletic in junior high school feel better about themselves than those who remain short and skinny. Researchers have linked late physical maturation in boys to the develop-
ment of both positive personality traits (humor, perceptiveness, flexibility, creativity, and leadership skills) and negative ones (restlessness and lack of poise). In most cases, adolescents gradually become more accepting of their bodies in the years following junior high school.

Further Reading


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<tr>
<th>Sexually active by age</th>
<th>All (Number)</th>
<th>All (Percent)</th>
<th>Boys (Number)</th>
<th>Boys (Percent)</th>
<th>Girls (Number)</th>
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<td>40</td>
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</tr>
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</table>

*This table reports data on the number and percent of adolescents who have become sexually active by a certain age. Data were gathered by the National Longitudinal Survey of Youth, 1988-92.

Ethel Dench Puffer
1872-1950
American educator and psychologist.

Ethel Dench Puffer was born in Framingham, Massachusetts, the eldest of four daughters. Her family was of native New England stock and highly educated by the standard of the era. After graduating from Smith College in 1891 at the age of 19 and teaching high school for one year in New Hampshire, Puffer returned to Smith as an instructor of mathematics, where she taught for the next three years while developing a keen interest in psychology. In 1895, Puffer traveled to Germany to study aesthetics under Hugo Münsterberg (1863-1916), then a professor of psychology at the University of Freiberg. On the strength of her research, she was awarded a fellowship for graduate study by the Association of Collegiate Alumnae. Enrolling in Radcliffe College in 1897 and working again under Münsterberg at Harvard University, she earned a certificate stating she had completed work equivalent to that of a doctoral candidate for the Harvard Ph.D. Because of the restrictions against granting the Harvard degree to women, however, Puffer was forced to make a special appeal to Radcliffe to grant her the doctoral degree. In 1902, she was one of the first four women to be offered the Radcliffe Ph.D.

Restricted from many research opportunities because of her gender, Puffer returned to teaching psychology at Radcliffe, Wellesley, and Simmons Colleges, and published a book, The Psychology of Beauty, in 1905, based on her research in aesthetics. In 1908, her marriage to Benjamin Howes further impacted her career due to cultural norms of the period which did not permit married women to work outside of the home. She continued to write scholarly articles through her forties while raising two children. Puffer’s published reflections of the role of women and the