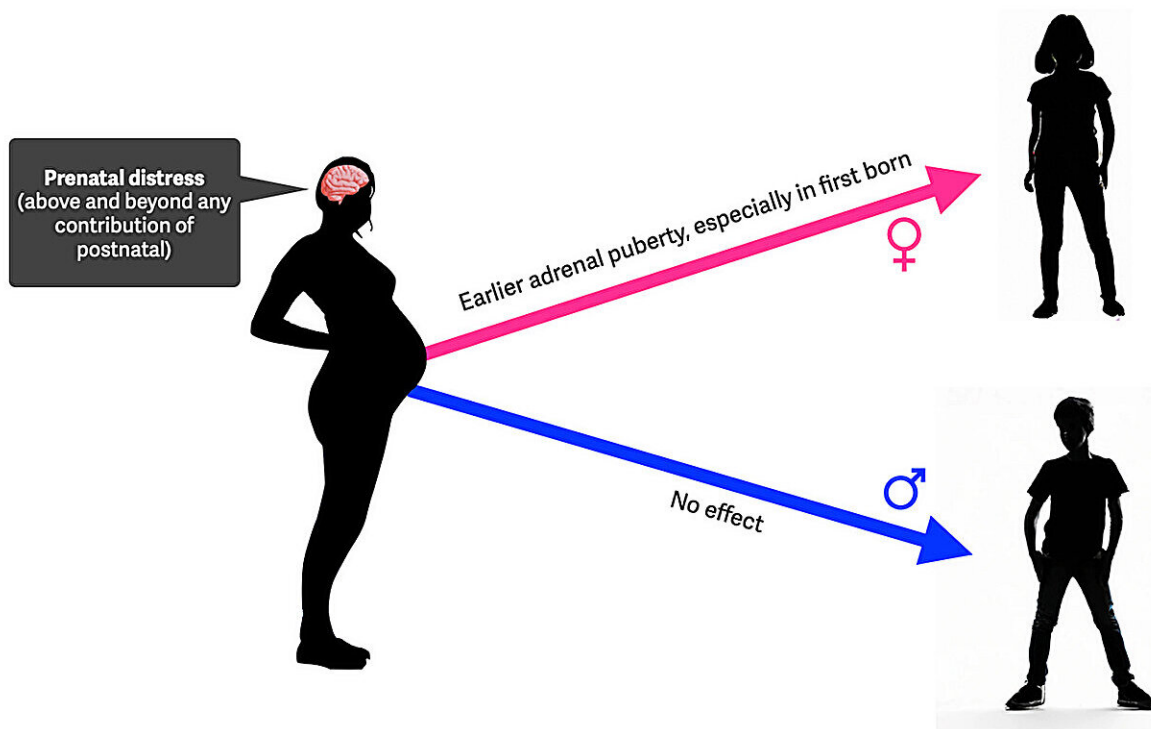


# Stress during pregnancy can lead to early maturation of first-born daughters, suggests study

February 20 2024, by Elizabeth Kivowitz



Silhouette of a pregnant woman with a pink arrow pointing to a girl and a blue arrow pointing to a boy. Credit: *Psychoneuroendocrinology* (2023). DOI: 10.1016/j.psyneuen.2023.106671

A UCLA-led team of researchers has found a correlation between early signs of adrenal puberty in first-born daughters and their mothers' having experienced high levels of prenatal stress. They did not find the same result in boys or daughters who were not first-born.

The 15-year longitudinal study's [findings were published](#) in the February issue of *Psychoneuroendocrinology*.

The study was the first to identify earlier patterns of adrenal puberty as a result of prenatal stress. Adrenal puberty is marked by changes like the growth of [body hair](#), pimples, and aspects of cognitive maturation but does not include breast development or the onset of menstruation for girls or testicular enlargement for boys.

The finding adds to research in the field of fetal programming, studies that explore the impact that stress and other factors affecting pregnant mothers can have on fetuses and children long after birth.

"This is a first-of-its-kind finding and is fascinating to look at through an evolutionary lens," said UCLA anthropologist Molly Fox, who led the study with colleagues from UC Irvine, UC Merced, Chapman University, and the University of Denver.

Fox explains that a first-born daughter's maturation, but not early onset of menstruation, may enable her to help her mother rear her other children successfully. The daughter becomes mature enough to help take care of children while not yet able to produce her own children, who would require her attention.

The finding also provides insights into the so-called "eldest daughter syndrome," the socio-cultural phenomenon discussed online that refers to the childcare and other domestic labor that first-born females often take on, consciously or unconsciously, to help with the traditional

parental or adult responsibilities required to run a household. The online discussions focus on oldest daughters feeling an overwhelming sense of responsibility for their family's well-being.

Researchers recruited participants for the study from two obstetric clinics in Southern California during routine first-trimester prenatal care visits. The women were 30 years old on average, all 18 or older, and experiencing singleton pregnancies. For about half of them, this was their first pregnancy.

All were English-speaking, 45% were white/non-Latina, and 30% were Latina. All were nonsmoking and did not use steroid medications, tobacco, alcohol, or other recreational drugs during pregnancy. Of the children born to these mothers, 48% were female, and 52% were male.

Women's stress, depression, and anxiety levels were measured at 15-, 19-, 25-, 31-, and 37-weeks' gestation to create a prenatal psychological distress composite score. They were also assessed at two to three months postpartum to assign a postnatal distress composite score. The depression assessment asked respondents to rate the truth of statements such as "I felt lonely." An example of an anxiety question was how often they felt particular symptoms, such as "jittery."

At ages 8–10, 11–12, and 13–16, children's biomarkers of adrenal and gonadal puberty were separately measured, including body hair, skin changes, growth in height or growth spurts, breast development, and the onset of menstruation (in females), voice changes and facial hair growth (in males). Hormone levels that are indicators of adrenal and gonadal puberty were measured through saliva samples at all assessment stages.

The study also measured childhood adversity to account for other factors known to correlate to early maturation or signs of puberty in children and adolescents. These included the death of a parent or parental

separation before age 5, the absence of the father, and low income-to-needs ratios experienced at ages 7–9.

"This [research](#) adds to the body of knowledge in our field showing the significant and lifelong impacts to women and their offspring when it comes to prenatal emotional, environmental, and other factors," Fox said. "This is important as we continue to come up with practical and policy solutions that contribute to greater access to health care and the general well-being of pregnant mothers."

**More information:** Molly M. Fox et al, Mothers' prenatal distress accelerates adrenal pubertal development in daughters, *Psychoneuroendocrinology* (2023). [DOI: 10.1016/j.psyneuen.2023.106671](#)

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