

Earlier, later puberty may trigger aggression in boys

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Puberty that arrives earlier or later in adolescent boys relative to their peers can trigger chemicals that are related to antisocial behavior, according to researchers, whose findings have key implications for parents with aggressive boys.

"[Aggressive behavior](#) can begin very early, even in pre-school, and might be related to poor impulse control, difficulties in the family or just overall general problem behavior," said Elizabeth J. Susman, the Jean Phillips Shibley professor of biobehavioral health, Penn State. "We wanted to find out if earlier or later timing of [puberty](#) in adolescents has any biological factors related to it."

Susman and her colleagues looked at how the timing of puberty affects cortisol, a stress hormone, and salivary alpha amylase, an enzyme in saliva used as indicator of stress. Their findings appear in the May issue of *Psychoneuroendocrinology*.

The researchers found that lower levels of the alpha amylase in [boys](#) who experienced earlier maturity and higher levels of cortisol in boys who experienced later maturity are related to antisocial behavior. They found no similar correlation in girls.

"This is the first study to show that the timing of puberty moderates biological risks of antisocial behavior," said Susman. "The implication that parents should be especially sensitive to picking up signs of earlier or later puberty in their children. "Parents and healthcare providers

should be aware of how puberty can be stressful -- behaviorally and biologically -- on the kids."

Why the findings are statistically significant for boys and not girls remains unclear.

"At puberty, boys produce a lot of testosterone and testosterone is a stress hormone as well," added Susman. "It may be that compared to girls, boys just have more biological hormone changes that may lead to antisocial behavior."

The researchers used a child behavior checklist to test 135 boys and girls ages 8 to 13 for signs of antisocial behavior -- aggression, rule breaking, social and attention problems, defiance, and conduct disorder.

Researchers also collected saliva samples before and after a stressful laboratory test, while pediatric nurses determined the stage of puberty for each child.

"We had the children tell a story and do a mental arithmetic test," said Susman. "To evoke a stress response, the children were told that judges would evaluate the test results with those of other children."

Statistical analyses of the children's cortisol and salivary enzyme levels, as well as the timing of puberty and symptoms of antisocial behavior, suggest that overall, antisocial boys are characterized by a later onset of puberty and higher levels of cortisol.

However, boys who reached puberty earlier and had lower levels of the salivary enzyme specifically showed greater problems related to rule breaking and conduct disorder. These boys were also more aggressive than those in the group that experienced puberty later.

"We have shown that the relationship between cortisol, salivary amylase,

and [antisocial behavior](#) is linked to the timing of puberty," said Susman. "This is the first study to show how the timing of puberty moderates biological vulnerabilities in children."

Provided by Pennsylvania State University

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