

Hormones may affect girls' interests, but not their gender identity or playmates

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Prenatal exposure to male hormones influences which activities girls are interested and engage in, but the effects of those hormones don't extend to gender identity or who they socialize with, according to Penn State

researchers.

The researchers explored how prenatal exposure to androgens—hormones that are typically higher in males than in females—affected whether girls played more often with boys or girls.

They found that androgen exposure was not associated with girls spending more or less time in activities with other girls, but it was associated with an increased interest and more time spent in activities that have traditionally been thought of as masculine, like building things or playing or watching sports.

Sheri Berenbaum, professor of psychology, Penn State, said the results—published in the Archives of Sexual Behavior—support the idea that [gender](#) development is a complex process that does not solely rely on either biological or social factors.

"People used to think—and some still do—that gender development and behavior is based either on a person's biology or social environment," Berenbaum said. "But I think people now realize that it's both, and the question is how these forces work together. So we're trying to delve into how hormones and socialization both affect gender development."

According to the researchers, children typically begin spending more time socializing with children of their own gender in early childhood, referred to as "sex segregation." Berenbaum said this tendency has been hypothesized to result from such factors as [gender identity](#) and personal characteristics.

Berenbaum said the study was an opportunity for researchers from different backgrounds—some who look at gender from a biological perspective and some who view it from a socialization perspective—to work together to see how these perspectives merge.

The researchers found they could examine the effects of hormones on sex segregation by studying girls with classical and non-classical congenital adrenal hyperplasia (CAH). Girls with classical CAH are exposed to excess levels of androgens prenatally, while girls with non-classical CAH are not.

The researchers recruited 54 girls between the ages of 10 and 13 with CAH—40 with classical CAH and 14 with non-classical CAH. They interviewed the girls about their activity interests, gender identity and attitudes about gender roles, among other things. The researchers also called the girls on seven evenings over the next two to four weeks to ask them how much time they spent on particular activities that day, and who they spent their time with.

"Our hypothesis was that the girls with classical CAH, the ones with prenatal androgen exposure, would spend more time with boys," Berenbaum said. "But because we also knew that most of these girls identified as girls, we thought that they might spend more of their time with girls. As it turned out, they did not spend more time with boys."

The researchers found that there was no significant association between androgen exposure and girls' time spent with either boys or girls. But, they did find that girls with classical CAH—those with prenatal androgen exposure—spent more time in male-typical activities and less time in female-typical activities.

Additionally, they found that the majority of girls with classical CAH identified as girls and had typical attitudes about gender, which could contribute to their interacting mainly with other girls, a pattern that suggests that hormones may not have an effect on gender identity and attitudes, according to Berenbaum.

Susan McHale, distinguished professor of human development and

family studies, Penn State, agreed that the results suggest that gender development and segregation result from both biological and social influences.

"A number of theories have been proposed to explain [sex segregation](#), most of which focus on socialization," McHale said. "Findings from this study suggest that gender development is more complex than a simple matter of socialization and are consistent with the idea that nature and nurture interact to explain gender development, and they illuminate one such interactive process."

In an additional paper recently published in *Child Development Perspectives*, Berenbaum discussed the complexity of androgen effects on behavior and the value of studying girls with CAH. She said that in the future, she would like to continue studying the brain structure of [girls](#) with CAH and further explore how biology and socialization work together to influence development.

"Behavior is complex, but some people resist the idea that biology influences behavior because they think it means that behavior is predetermined and cannot be changed," Berenbaum said. "But that's not true. Biological influences don't mean everything is fixed when you're born. Behaviors that are influenced by hormones and other biological processes can still be changed by the environment."

More information: Sheri A. Berenbaum et al, Gendered Peer Involvement in Girls with Congenital Adrenal Hyperplasia: Effects of Prenatal Androgens, Gendered Activities, and Gender Cognitions, *Archives of Sexual Behavior* (2018). [DOI: 10.1007/s10508-017-1112-4](https://doi.org/10.1007/s10508-017-1112-4)

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