

# Less physical activity in adolescence likely rooted in biology, says study

November 2 2023

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The slowdown of physical activity during adolescence is not likely caused by lifestyle and environment but by energy demands placed on the body as it grows and sexually matures, according to a new study by

researchers at the University of Colorado Anschutz Medical Campus.

The [study](#), published in the *Proceedings of the Royal Society B: Biological Sciences*, examined the lifestyles of the physically active Tsimane people, an Indigenous population of forager-horticulturalists in lowland Bolivia, to see similarities and differences to adolescents living in post-industrialized nations.

"We wanted to look at the role of environment and the role of biology," said the study's lead author Ann E. Caldwell, Ph.D., assistant professor of medicine specializing in endocrinology and metabolism at the University of Colorado School of Medicine. "These changes are normally thought to be associated with psychosocial changes that happen in adolescence in technologically advanced societies, but we looked at this from an evolutionary standpoint."

The Tsimane had minimal hypertension, coronary artery disease and ate mostly what they grew or hunted. Their levels of physical activity were far higher than those in post-industrialized societies. Yet, at older ages they also do less physical activity during adolescence, like their cohorts in other cultures.

Scientists know that physical activity declines with age and that males are more active than females. The steepest age-related declines in physical activity occur in adolescence and at earlier ages in girls in several post-industrialized countries. The lack of physical activity is one of the biggest predictors of chronic disease.

Recent studies found that 28% of adults worldwide are insufficiently active, while a staggering 80% of adolescents worldwide fall into this category. This is defined as less than 150 minutes a week of at least moderate intensity activity for adults and less than 420 minutes a week for children and adolescents.

"Adolescence is a life stage characterized by distinct endocrinological, anatomical and cognitive changes that likely require substantial energetic resources, though the energetic costs of these hormones and related physiological sequelae have not been fully quantified," Caldwell said.

As the body rapidly grows, it requires massive energy boosts to build muscle, bone, neural connections and the elements of sexual maturity. High levels of physical activity at this time and low levels of food will delay sexual maturity. Girls in particular pay a higher price for physical activity since it can slow down sexual maturation, critical from an evolutionary standpoint.

Caldwell, who did field work in Bolivia for eight months, said the striking similarities between the Tsimane adolescent experience and those in post-industrial societies suggest a universal trade off in energy that happens during puberty and is likely inherent in all human lifespans.

Even so, the Tsimane were more physically active overall suggesting that [environmental factors](#) strongly influence absolute levels of activity, and further suggest that being active before adolescence sets the groundwork for staying more active after.

Caldwell said [early intervention](#) could help stave off the pubertal reduction in physical activity consistently observed just before and during puberty. The interventions should also be sex specific, she said, earlier for girls since they mature at earlier ages.

"Adolescence has emerged as a critical window to look at this phenomenon," Caldwell said. "Public health interventions might be more effective if they target [physical activity](#) earlier when there are fewer competing demands for energy."

**More information:** Ann E. Caldwell et al, Adolescence is

characterized by more sedentary behaviour and less physical activity even among highly active forager-farmers, *Proceedings of the Royal Society B: Biological Sciences* (2023). [DOI: 10.1098/rspb.2023.1764](https://doi.org/10.1098/rspb.2023.1764)

Provided by CU Anschutz Medical Campus

Citation: Less physical activity in adolescence likely rooted in biology, says study (2023, November 2) retrieved 28 April 2024 from <https://medicalxpress.com/news/2023-11-physical-adolescence-rooted-biology.html>

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