

Jacky dragon moms' time in the sun affects their kids

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Jacky dragon. Credit: UNSW Sydney. Lisa Schwanz.

A new study conducted at the University of New South Wales and

published in the November/December 2020 issue of *Physiological and Biochemical Zoology* sheds light on a possible connection between an animal's environmental conditions and the traits of its offspring. The study, *Maternal Temperature, Corticosterone, and Body Condition as Mediators of Maternal Effects in Jacky Dragons (Amphibolurus muricatus)*, focused on how maternal condition and stress hormone (corticosterone) levels in jacky dragons (*Amphibolurus muricatus*) potentially translate a mom's heat exposure to effects on her offspring.

Ectothermic species, such as lizards, often rely on external heat sources to manage their body temperature. It turns out that maternal temperature can affect [offspring](#) traits such as gender and the rate of growth. While those trait changes have been documented, the means by which information passes from parent to offspring are poorly known.

Maternal effects theory, in particular, has helped answer a number of important biological questions related to evolution. However, the mechanisms for how those effects take place has not been nearly as well-developed, leading to unanswered questions concerning proximate physical causes.

"Mechanisms by which thermal information can be passed onto offspring have been underexplored," writes the study's author, Gracie Liu. "Here, we investigated [corticosterone](#) as a potential mediator of thermal maternal effects."

The study placed female jacky dragons in two different thermal regimes—one that exposed the subject to 7 hours of thermal basking treatments each day, the other exposing the subject to 11 hours of the same treatment each day—then measured the levels of corticosterone in the subjects' blood and examined any possible relation connected to their offspring.

Corticosterone is a [steroid hormone](#) associated with the "stress" response, energy mobilization, and suppression of the immune system. Such hormones often serve as a potential connection between offspring phenotypes and the environment of the mother, since they transfer from mother to offspring and can play a role in physiology, behavior and similar factors.

The results indicated that such "thermal opportunity" does have an effect on mothers and their offspring. Specifically, lizards exposed to the longer 11-hour regime show significantly higher corticosterone levels in their bloodstream than those exposed to the 7-hour regime.

However, it was corticosterone's connection to maternal body condition that led to increased reproductive output—which included both the number of eggs in a subject's given clutch and the overall size of the clutch—as well as an increased size in offspring at hatching. It did not, however, have a corresponding effect on the growth of those offspring or their gender.

More specifically, the basking treatment appeared to be interrelated with maternal corticosterone levels and body condition. That, in turn, had an interactive effect on the resulting clutch, which suggests that the combination of condition, corticosterone and overall maternal temperature could be conveying information about the mother's external environment into her offspring.

"These findings indicate that thermal opportunity alters physiology," Liu writes. "With potential consequences for fitness."

More information: Gracie Liu et al, Maternal Temperature, Corticosterone, and Body Condition as Mediators of Maternal Effects in Jacky Dragons (*Amphibolurus muricatus*), *Physiological and Biochemical Zoology* (2020). [DOI: 10.1086/711955](https://doi.org/10.1086/711955)

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