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Does corticosterone influence nestling begging and sibling competition in Florida Scrub-Jays?

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Introduction

This study examines whether exposure to corticosterone (CORT) influences nestling behavior.

Begging is a honest signal of nutritional need and condition that elicits feeding from parents

Parental provisioning is a limited resource (“parent-offspring conflict”) that can elicit sibling competition for available food

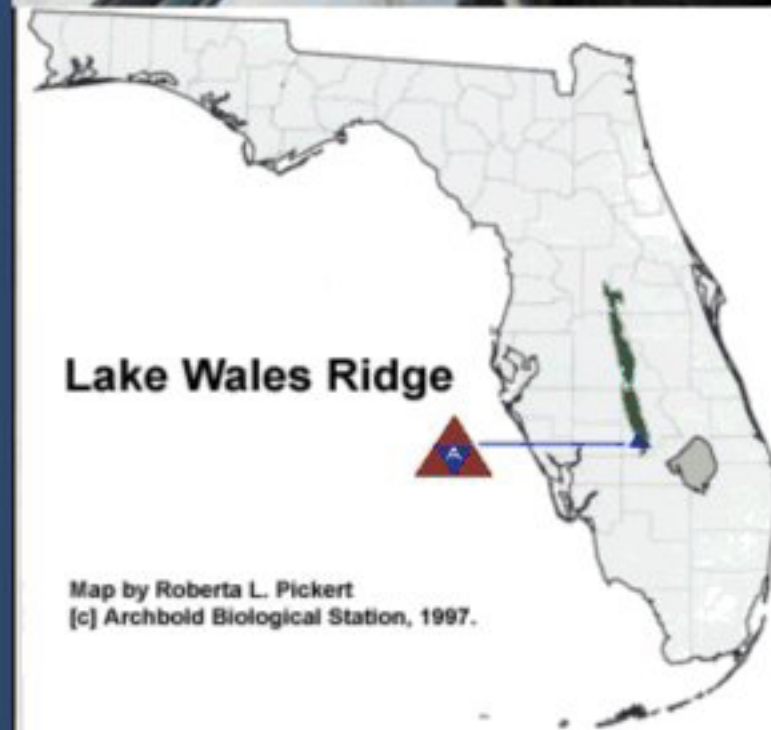
CORT is an adrenal steroid hormone, commonly associated with the stress response. Nestling CORT secretion is hypothesized to promote begging to compensate for a nutritional deficiency.

Hypothesis and Prediction

H: CORT mediates nestling begging behavior
P: Exogenous CORT will increase begging rate

The Florida Scrub-jay

- Long-lived (~15yr), non-migratory bird endemic to peninsular Florida
- Nesting: March-May, with a brood of 1-5. Chicks are altricial and hatch relatively synchronously
- All individuals in the study population are color-banded and tracked from hatching until death
- Different behavioral and physiological phenotypes exist within our population. Evidence suggests phenotype determination is established during development.



Methods: Behavior Monitoring

- TowerCams:** high-def video cameras mounted atop extendable (1.9 - 3.2 m) poles
- Used to monitor nestling and adult behaviors without human presence disturbing birds
- All nests were filmed for ~2 hrs/day on 4 days
- All nestlings were ID'd at the beginning of film



Methods: CORT Treatment

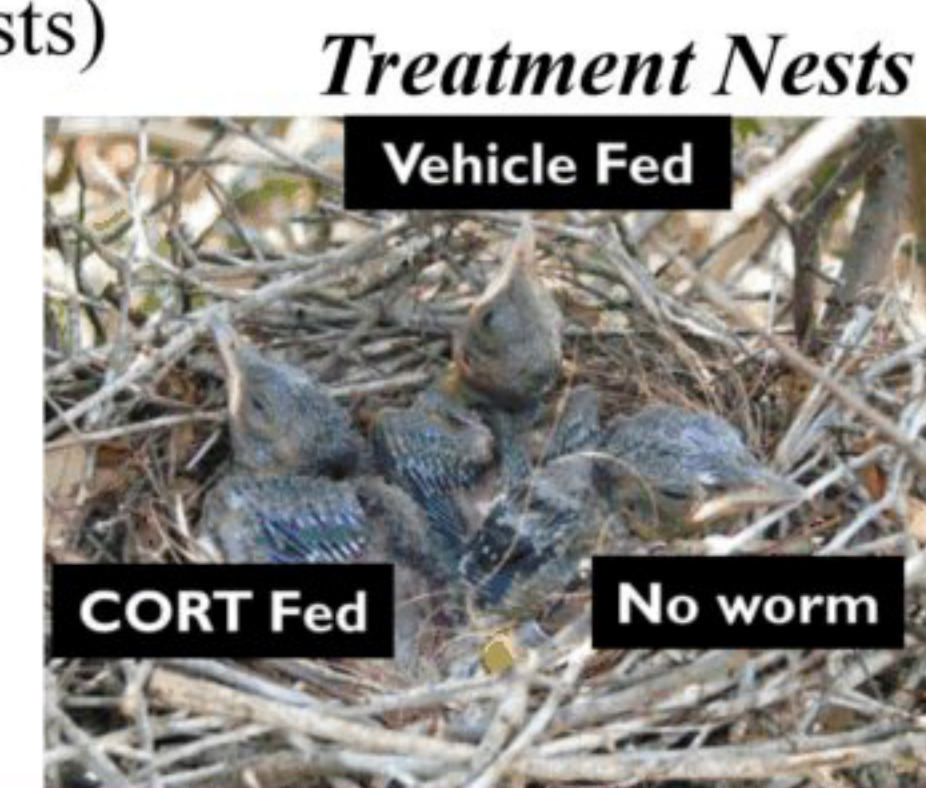
Treatment nests (2012, N=7 nests; 2013, N=15 nests)

- CORT** – A single nestling received a twice-daily dose of CORT (20 µg) delivered in a waxworm for 3.5 days
- Vehicle** – A single nestling received a vehicle-injected waxworm
- No worm** – In nests with >2 nestlings, all others received no worm

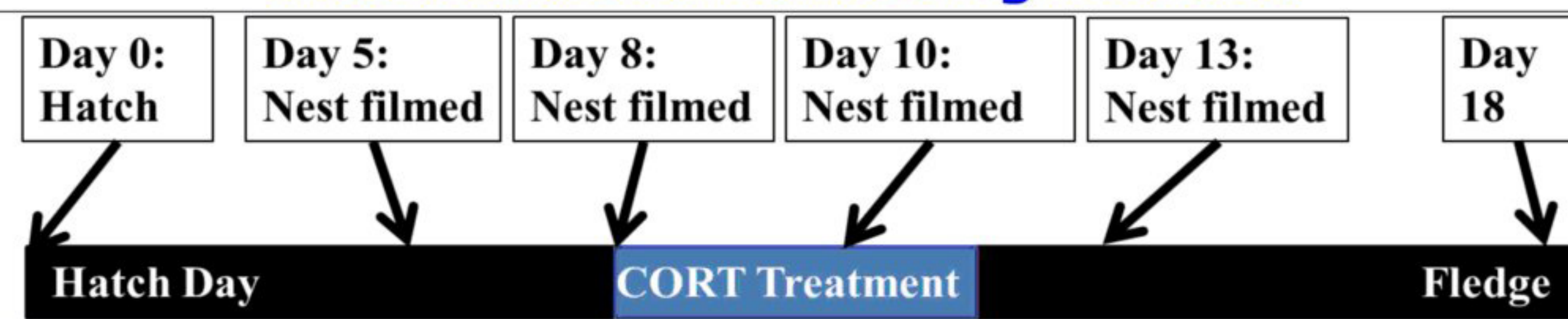
Control nests (2012, N=6 nests; 2013, N=21 nests)

All nestlings received routine monitoring and handling but no waxworms

Behavior was monitored on the mornings of days 8 & 10 post-hatch (during the period of CORT dosage), as well as days 5 & 13.

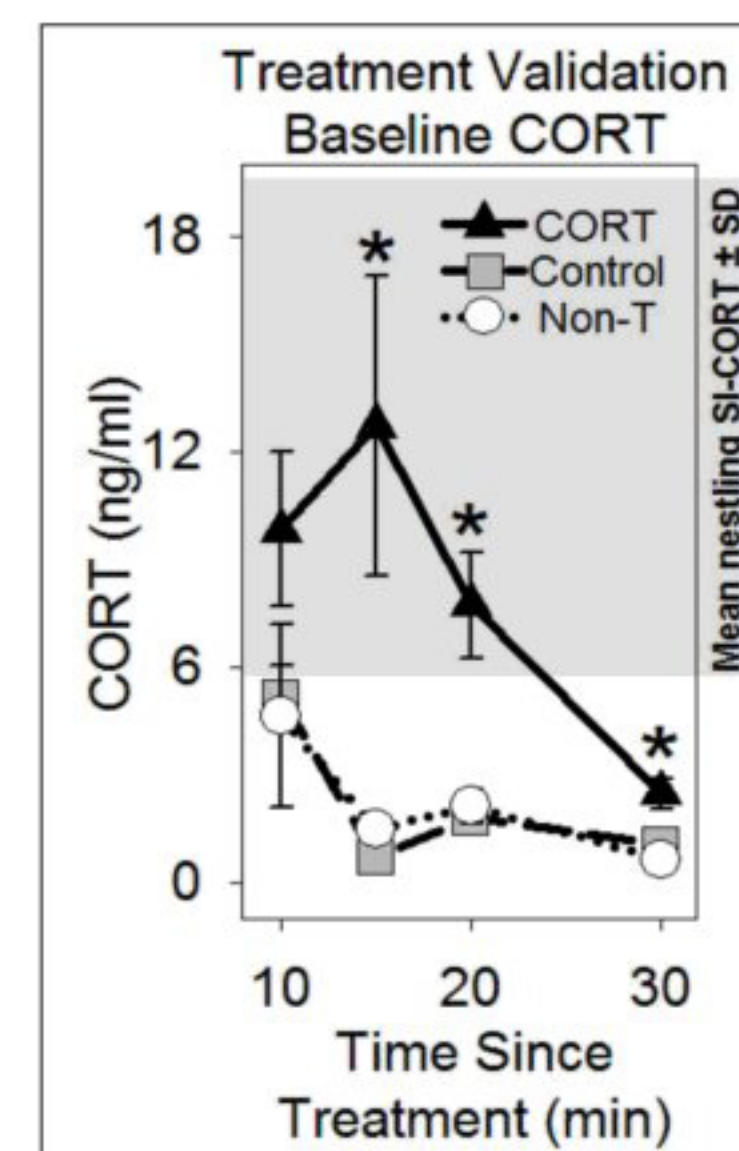
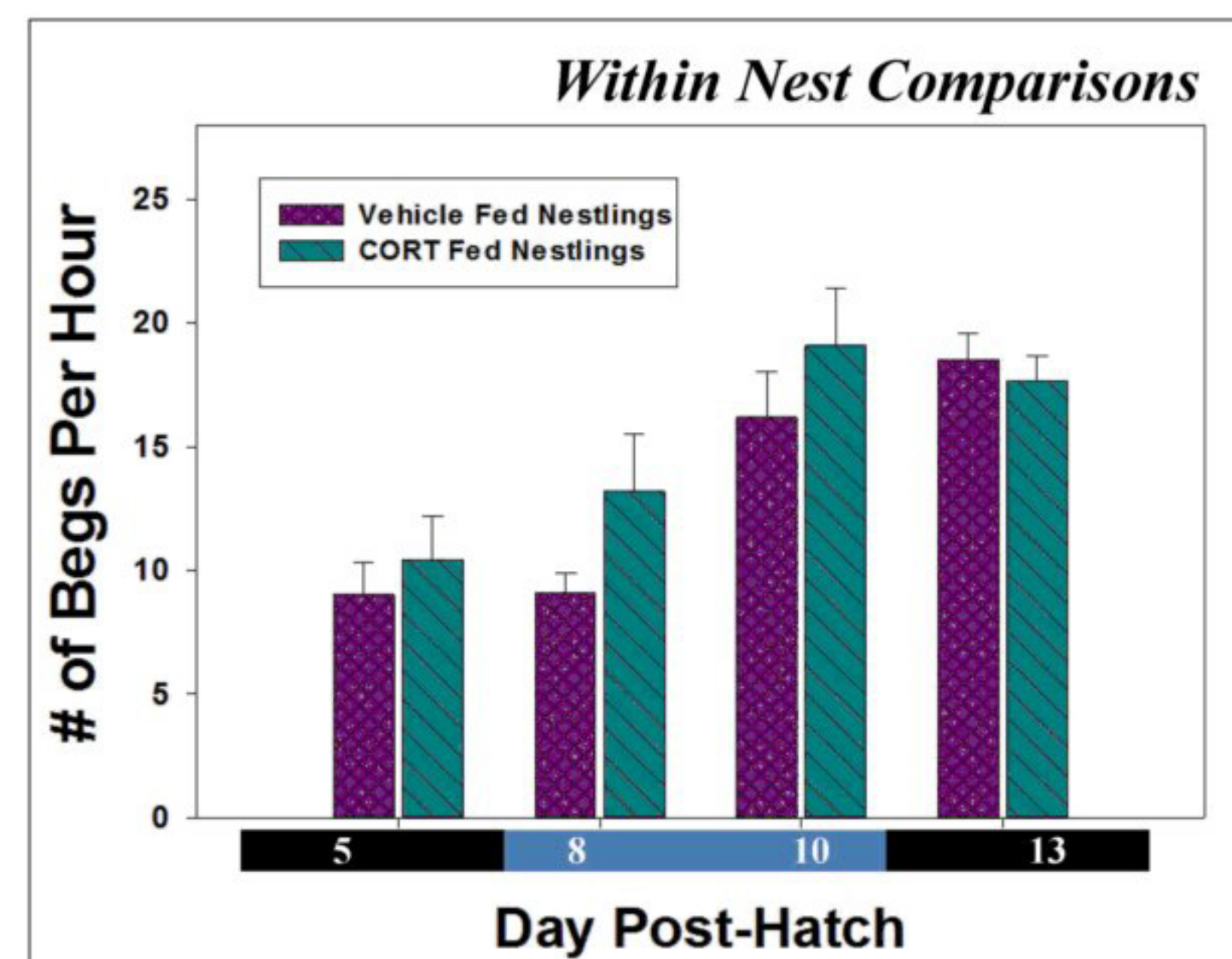


Treatment and Monitoring Timeline



Results: Treatment Nests

1) Do CORT-fed nestlings beg more than vehicle-fed nestlings?

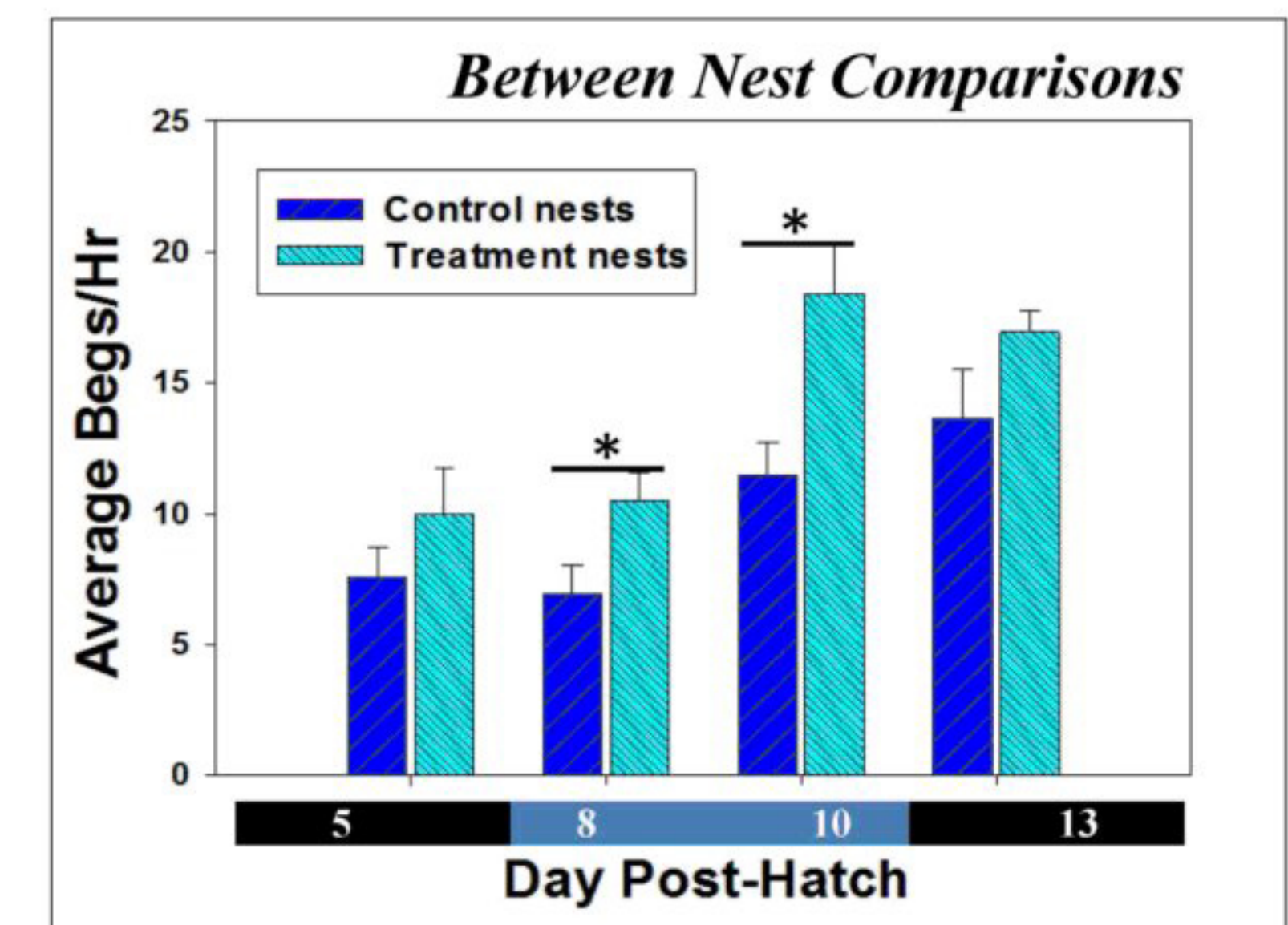


No! No difference between the begging rates of CORT-fed individuals and vehicle-fed nest mates ($F_{(1,36)} = 1.58, P = 0.22$)

Overall increase in begging with nestling age ($F_{(1,36)} = 15.41, P < 0.001$)

Results: Treatment vs Control Nests

2) Does the presence of a CORT-fed nestling influence sibling behavior?



Yes! Mean begging rate of all nestlings within Treatment nests was greater on treatment days than nestlings within Control nests ($F_{(1,39)} = 11.22, P = 0.002$; Day 8: $P = 0.043$; Day 10: $P = 0.007$)

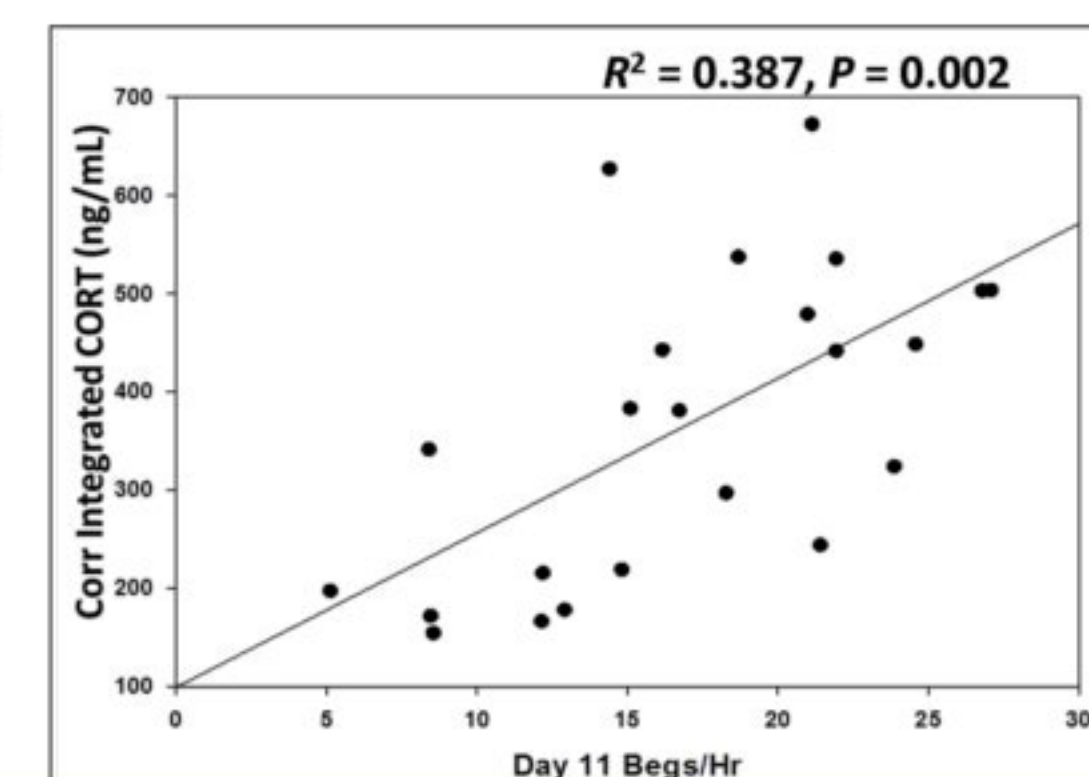
Summary and Implications

- CORT-fed nestlings did not beg more than vehicle-fed nest mates
- However, all nestlings in Treatment nests begged more on average than nestlings in Control nests on days of CORT treatment
- CORT may stimulate begging in FSJ nestlings but sibling competition may have masked effects of CORT within a nest

Further analysis will consider a) which individual initiates begging bout, b) parental preferential feeding and c) long-term effects of CORT.

Link between begging, CORT, and phenotype?

A nestling's begging rate (control nests) is correlated with its physiological stress response post fledging and at 1 year of age. The CORT response to stress in FSJs is repeatable and correlates with parental behavior, neophobia, and lifespan.



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