Does Incubation Stage Affect Singing on the Nest in Northern Mockingbirds?

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Background

- Singing on the Nest (SOTN) is a perplexing behavior exhibited by a number of passerine species such as Northern Mockingbirds.
- The behavior known as SOTN is when a incubating bird is singing on the nest while also caring for eggs or nestlings
- SOTN is puzzling due to the cost involved in displaying the behavior. Some of these costs include exposure to increased predation and parasitism. However, certain hypothesis indicate that coordinated parental care, territoriality and appearance of predators might be causes of this behavior. (Leonard 2008)
- The occurrence of SOTN is largely untested and not many studies are available to support current hypothesis. Additionally, studies on Northern Mockingbirds have not been done regarding this behavior.

Research Question

How does SOTN behavior vary in duration across the entire nestling cycle?

How does singing on the nest differ between eggs and nestlings?

Methods

- The species studied is the Northern Mockingbird (*Mimus Polyglottus*)
- Data collected was provided by previous research studies done by Christine Stracey-Richardson in 2008 and 2009.
- Video and audio recording used for the experiment data was gathered near Gainesville, Florida through the use of OPCM security cameras with added LEDS for night vision. These cameras were set up near the nest and concealed with the environment to record the mockingbird behavior.(Stracey, C. M. 2011)
- Audio data from the study was put through computer programs which analyzed the vocalizations for SOTN and generated time stamps at which the behavior occurred.
- With a larger group these time stamps were investigated and data was collected on condition of nest, duration of song while on nest and the date age of offspring when behavior was occurring and nest hatch date. Additionally the data was peer-reviewed during the data collection to insure accuracy.
- Data from 10 different nests was gathered and duration of SOTN for each day wad recorded along with nest stage and hatch dates.

Results

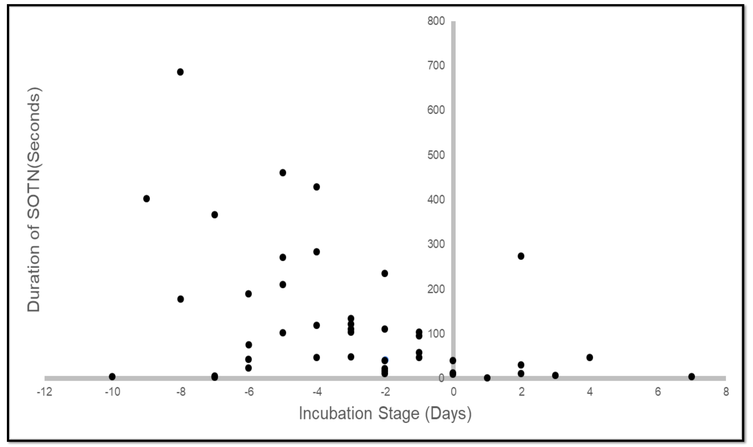

Figure 1- The SOTN duration displayed of every nest studied with seconds per day compared to the age of nestlings in days. The 0 indicates the date of hatching of the mockingbirds. Additionally, data for every nest everyday was not available.

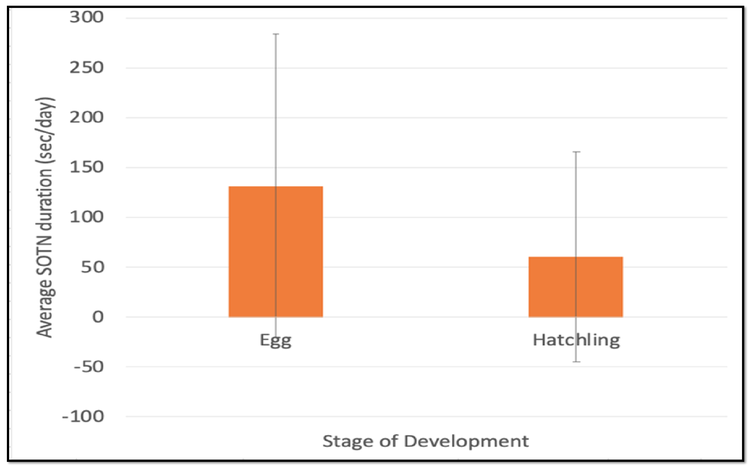

Figure 2- The average duration of SOTN was averaged for condition of nest which is either. Hatchlings or nestlings. Data from 10 nests is displayed. Standard error is displayed.

Results Summary

The duration of SOTN fluctuates with the age of nestlings and displays no trend. However, we can see that duration is longer in during the egg stage and higher in the 9-10 days before hatching or close to when the eggs are laid. After this a significant drop in SOTN duration occurs at 6-7 days before hatch date which then increases at 4-5 days before hatching. A drop is seen again at 1-3 days before eggs hatching and significantly decreases after hatch. The outcomes show that during incubation and when eggs were present the duration of SOTN was longer compared to when the eggs were hatchlings.

Conclusions

- Through our analysis we found that higher duration of SOTN occurred when the nest was at the egg stage compared to when it was the hatchling stage. The highest durations of SOTN were found 7-8 days before the hatch date and the durations fluctuated towards a general lower duration time as the eggs were close to hatching.
- Most researches on SOTN have hypothesized that singing on the nest occurs due to parental communication to eggs and have suggested that parental communication could increase when the eggs were close to hatching. (Kleindorfer, S., Evans, C., & Mahr, K. 2016;Leonard 2008).
- This contradicts our finding since longer durations were observed earlier in the incubation process. Other hypothesis such as SOTN being a defense mechanism to protect eggs at vulnerable stages such as earlier in the incubation state are possible as well.(Leonard 2008).
- Major limitations of this experiment were the fact that the cameras were used to point at the nest and incubating bird therefore the other parent was not visible so assessments about parental care could not be made. Additionally, a problem faced was the small sample size which caused the large error bars in results.

Further directions

If given the opportunity to continue our research we would collect more data to create frequency data which could be used to determine when the number of SOTN call were highest since current data only accounts for duration. Additionally, further we could potentially do a manipulative experiment as see whether the presence of a predator at certain incubation stages allowed for longer or shorter calls.

Acknowledgements

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References

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