

# Aggressive behavior of juvenile Little Brown Skinks (*Scincella lateralis*)

## Abstract

*Scincella lateralis*, commonly known as the “Little Brown Skink”, is a lizard species that is very common in northeastern Oklahoma. There has been much research done on adult lizards of this species and neonates of the related species, *Plestiodon fasciatus* or five-lined skink, to observe their aggressive behaviors toward one another when in the same space. However, no research has been done over neonates of *S. lateralis*. For this study, aggressive behaviors were observed to describe behavioral interactions of neonate little brown skinks to determine if neonate little brown skinks were more similar to adults of their species or neonates of the five-lined skink species. Two neonate lizards were placed into an observation chamber with a partition separating the two. The lizards were then allowed to acclimate to their home side for 48 hours before the trial began. After the 48 hour acclimation period, the partition was removed and a retreat was placed in the center of the chamber. Over an hour timespan, the lizards were allowed to interact while being video recorded for later analysis. Upon review of the tapes, very little aggressive behavior was shown by the neonate little brown skinks. In the majority of trials, the neonates ignored each other and when aggressive behavior was shown, it was simply a tail-twitch or a lunge and then avoidance of each other the remainder of the time. While the lizards spent most of their time apart on opposite sides of the observation chamber, they did spend a large amount of time under the retreat together. It was indicated through this study that although neonate little

brown skinks are more like adults of their species than neonate five lined skinks they still differ much from adults of their species and their behavior is unique to themselves. It can be assumed that neonate little brown skinks spent more time under the retreat than adults of their species because they are more susceptible to predators so they are less likely to be out in the open when shelter is available, even if that means sharing the space.

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## Introduction

There have been a significant number of studies done over lizard behavior, but most have been done over only a few families of lizards. Despite being the largest family of lizards, the skinks (family Scincidae), have not received as much attention as other families of lizards - probably because of their secretive nature. Recently, there have been several studies of the skink species in northeastern Oklahoma. For example: Myers and Paulissen (2017) found that adult male Little Brown Skink (LBS) were aggressive toward each other, tended to avoid each other, and never shared a retreat. A follow-up study showed that female LBS show much less aggression toward each other, but still avoid each other and don't share retreats. The common garden skink (*Lampropholis guichenoti*), from Australia, is another species of skink that has been studied in the past. Typical aggressive behaviors found in these skinks were biting, chasing, facing-off, retreating, and tail lashing (wiggling) were all observed (Torr and Shine 1994). A North American skink studied for their aggressive behaviors is the *Scincella lateralis*, which was studied during the non-breeding season by Akin (1998). In this study, behaviors were separated into four different categories: Avoidance, Aggression, Assertion, and Dominance (Akin, 1998). Other aggressive behaviors that have been observed in these lizards include lunging, chasing, and biting (Whittier and Martin, 1992). The previously mentioned studies are all great examples of aggressive behaviors observed in adult skinks. By contrast, Paulissen and Moran (2017) found that neonate Five Lined Skinks (*Plestiodon fasciatus*) show some aggression toward each other and avoid each other, but do commonly share retreats.

The subject of my research is neonate Little Brown Skinks, *Scincella lateralis*. In Oklahoma, neonate lizards hatch from late June through early August (Paulissen and Moran, 2017). With neonates hatching throughout these months, there are often various sizes of neonates competing

for the same space and the same resources. The purpose of my study was to answer the following questions: (1) Are the aggressive behaviors of neonate LBS more similar to adults of their own species or neonates of the five-lined skinks?; (2) Is the difference between neonate five-lines and adult LBS due to differences in the species or due to differences in the age-classes?

## **Methods**

### Study Animals and Captive Maintenance

*Scincella lateralis* hatchlings were collected from Sparrowhawk Primitive Area (about 15 km from NSU campus) near Tahlequah from July through September, 2019. Once captured, each lizard's snout-vent length (SVL) was measured in millimeters and each lizard's weight was measured in grams. After measurements were taken, the lizards were placed into individual cages (30.5 cm x 14.0 cm x 7.6 cm) until the trials were run. The cages had a paper towel on the floor and a retreat (a ¼ arc of a cardboard toilet paper tube). The cages were placed under a 75-watt heat lamp that was set to a timer based on the natural photoperiod (of 12:12 L:D). Each day, the lizards were fed 3 to 5 mealworms each and received water. Testing was completed within one week of capture; lizards were tested only once after which they were released near their site of capture. We did 9 trials during this experiment, using 18 different lizards.

### Experimental Design and Testing

For each of the trials, a small plastic box, was used as the observation tank. Cardboard was placed on the sides and back of the tank and the front side was left uncovered in order to facilitate filming of the trials. Dirt was placed at the bottom of the tank and a removable divider was used to split the tank into two equal halves. In order for the lizards to behave in their natural manner, two heat lamps, one suspended above each half of the tank, were used to ensure that the lizards were warm enough. Before testing, one lizard was placed on either side of the observation tank; the two lizards were left undisturbed for 48 hours. During this time, each lizard had access to food (mealworms), water, and a shelter, which was a one-quarter arc of a cardboard toilet

paper tube. A Sony Rev 280 video recorder was set up in front of the observation tank to film lizard interactions.

To begin a trial, the divider, food and water were removed and a single shelter was placed in the center of the tank. Over the span of an hour, lizard interactions were recorded. Although (SVL) was similar in size, there was enough of a difference that it was possible to tell the two lizards apart on the recorded videos (9 trials).

### Data Analysis

Each tape that was recorded was then reviewed to observe the behavioral interactions between the two lizards. An interaction was defined as any instance in which the two lizards came within one body length of each other. Behaviors of each lizard during an interaction were observed and used to determine which lizard “won” the interaction, or if no reaction occurred. A lizard “won” an interaction if it confronted the other lizard or caused the second lizard to retreat to another location. Aggressive behaviors that were observed included; lunging and tail-twitching. Lunging was defined as one lizard, usually the dominant, swiftly approaching the face or the tail of the other lizard in an aggressive manner. Tail-twitching was a quick side-to-side movement of the tail just before retreating or lunging towards the other lizard, this behavior was seen frequently in both the dominant and subordinate lizard. Avoiding was another behavior that was observed during these trials. Avoiding was a non-aggressive behavior defined as the lizards, both dominant and subordinate basically “ignoring” each other, this was the behavior that was observed the most.

The location of the lizards during each interaction was recorded; this was done to observe which lizard was on its original home side. The amount of time each lizard spent on each side of the

observation tank (home side, opposite side) was also recorded. The amount of time each lizard spent in the shelter was recorded. The amount of time the lizards spent together and apart, as well as on the same side versus opposite side, was recorded. Time spent “together” was defined as lizards being on the same side of the observation tank or in the shelter together. “Apart” was defined as the lizards being on separate sides of the tank or one in the retreat and one outside of the shelter. Statistical comparisons of the means of each variable for the dominant versus the subordinate lizard were made using a paired t-test.

## Results

In all 9 trials a clear dominant lizard was identified. In 8 of the 9 trials, the dominant lizard was the one with a larger SVL. On average, there were very few interactions and hardly any aggressive behavior displayed by either the subordinate or the dominant lizard during the one-hour trials (Table 1).

**Table 1** – Mean  $\pm$  SD number of behaviors displayed by neonate *Scincella lateralis* during 9 60-minute trials.

<b>Behavior</b>	<b>Dominant Neonate</b>	<b>Subordinate Neonate</b>	<b>Total of Aggressive Behaviors</b>	<b>P-Value</b>
<b>Chase</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>na</b>
<b>Lunge</b>	<b>0.22</b>	<b>0</b>	<b>0.22</b>	<b>na</b>
<b>Avoid</b>	<b>0.33</b>	<b>2.44</b>	<b>2.77</b>	<b>0.026</b>
<b>Tail Twitch</b>	<b>0.33</b>	<b>0.66</b>	<b>0.99</b>	<b>0.471</b>

The two neonates spent significantly more time on opposite sides of the observation chamber than on the same side and significantly more time “Apart” than “Together” (Table 2).



**Table 2a and 2b** – Mean  $\pm$  SD for time spent on the same side versus time spent on opposite sides and mean  $\pm$  SD for time spent apart versus time spent together. Results were determined in a paired t-test.

	<b>Same Side</b>	<b>Opposite Side</b>	<b>P-Value</b>
<b>2a.</b> Mean $\pm$ SD amount of time spent on the same side and on opposite sides (seconds)	202.2 $\pm$ 449.6	674.7 $\pm$ 449.6	0.014
	<b>Apart</b>	<b>Together</b>	<b>P-Value</b>
<b>2b.</b> Mean $\pm$ SD amount of time spent together and apart (seconds)	2676.4 $\pm$ 1867.0	923.6 $\pm$ 1867.0	0.023

Although it was found that neonates spend an average of over 700 seconds together under the retreat, they were under the retreat significantly less often than expected by chance (Table 3).

**Table 3** - Mean  $\pm$  standard deviation of the amount of time spent in the shelter versus what was expected. Results were determined in a paired t-test.

	<b>Both in Shelter</b>	<b>Expected Both in Shelter</b>	<b>P-Value</b>
Mean $\pm$ SD amount of time spent in shelter together (seconds)	721.3 $\pm$ 116.0	860.9 $\pm$ 116.0	0.007

## Discussion

Through previous studies, it has been shown that adult skinks of various species interact with one another and exhibit aggressive behaviors (Akin, 1998; Myers and Paulissen, 2017). This study shows how juvenile *Scincella lateralis* skinks compare to those adults previously studied (Myers and Paulissen 2017). While adult males frequently exhibited aggressive behaviors and adult females occasionally did so, neonates displayed hardly any aggression and barely interacted with each other. When near each other, the neonate lizards mostly ignored each other and kept to themselves. In the rare occasion that aggressive behaviors were displayed, the subordinate lizard showed to be more passive and typically avoided the dominant by fleeing to the other side of the observation chamber. Despite a nearly complete lack of aggressive behaviors, neonates still tend to separate themselves from each other in the observation chamber (Table 2).

The lizards in the trials were very similar in size, however, it was found in 8 of the 9 trials that the dominant lizard was the lizard larger in size (SVL). In 2 of the 9 trials aggressive behaviors were shown by the dominant lizard; typically lunging towards the subordinate lizard or the twitching of a tail if the subordinate got “too close”. The main action shown by both the dominant and subordinate lizard was avoidance. They spent significantly more time on opposite sides of the observation chamber (Table 2a) and spent significantly more time apart than together (Table 2b). This avoidance behavior and their small size could be beneficial to the juveniles in their natural habitat because it would give them the ability to hide from potential threats.

The neonates were more similar to adult females than males, but even here, there was less aggressive behavior. It was found that among all age-classes avoidance behavior was common. However, an interesting behavior shown by neonate LBS and not by their adult counterparts was

their nearly complete lack of aggressive behavior. Neonates of this species presented very few aggressive behaviors - some tail-twitching, very little lunging.

While they did spend most of their time apart from each other like the adult Little Brown Skinks, the neonates spent much more time under the retreat than the adults of their species did. In addition, the neonates spent much more time together under the retreat than adults. Neonates spent an average of 677 seconds under the retreat together, which was more than found by Myers and Paulissen in their study of adult males and adult females. It can be presumed that this is because the neonates are much more vulnerable to predation than their adult counterparts so they are far less likely to expose themselves to danger than the adult LBS. Although it appears the neonates were in the shelter together much more than adults, they were under the shelter together significantly less often than expected by chance (Table 3). Overall, the neonate *Scincella lateralis* are more like adults of their species than neonates of the Five Lined Skinks, but are still unique and vary from adults of their species.

## Literature Cited

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