

Heterospecific alarm call eavesdropping in non-vocal, white-bellied copper-striped skinks

(Emoia cyanura)

Holly Fuong, Kathryn N. Keeley, Yasemin Bulut

Department of Ecology and Evolutionary Biology, University of California Los Angeles

Editors' Note

This entry is being submitted for publication in scholarly journals and is thus withheld from this paper series. An abstract of the research follows the reflective essay.

Reflective Essay

Scholarship, or academic study, is the means by which we all find our way through this complex world. Exploring uncharted territory would be nothing without some background on how to begin—the basics. For future success, understanding the fundamentals of your field is a necessity. Without this basic groundwork, research may appear vast and insurmountable. Yet, with a bit of scholarship, anything can seem possible. This became blatantly clear to us when we began writing a research proposal for a class based on a study system that we were unsure existed, on an island that we had never been to. Scholarship was there for us to provide our foundation.

In Winter 2013, we went through an application and interview process to be a part of the Winter 2014 Field Marine Biology Quarter on Moorea, French Polynesia. This is a capstone experience for UCLA students interested in ecology, behavior, and evolution, involving an entire quarter dedicated to conducting field research. On the island, we conducted field experiments in animal behavior; specifically, we examined whether white-bellied copper-striped skinks (*Emoia cyanura*), a lizard, eavesdropped on different bird species' vocalizations. Because none of us had ever been to Moorea, our advisor, Dr. Daniel Blumstein, challenged us to approach our question in a fundamental way—to make it as generalized as possible so that we could easily link this to other species if white-bellied copper-striped skinks or any of the bird species we had chosen were not abundant on the island.

With this in mind, we began our search. Before arriving on the island, we had to develop a research proposal. Because our knowledge of the study system was limited, our project depended completely on the information we found through the UCLA Library Collections. We combed through the databases, focusing mostly on the Web of Science and Google Scholar

supported by UC e-Links. UCLA Library's *Getting Started: Information Research Tips* proved very useful by guiding us towards using the BOL proxy server. We became acquainted with the Web of Science, spending hours researching lizards, bird alarm calls, risk assessment of predators by prey, and previous studies based on the island. We learned to hone in our searches to make them more concise and accurate. With Web of Science's features that allow us to sort our results, we were able to choose the best articles for our needs. When the UC e-links pointed us towards journals available in the Biomedical Library, library staff assisted a first time visitor to the book stacks. The UCLA Library Collections were instrumental in our final research proposal and became even more useful once we got overseas.

Originally, we focused our project on skinks discriminating between the different vocalizations of bird species as a form of risk assessment, or being able to discriminate between their predators and non-predators. However, we found that skinks were not really discriminating between predators; skinks eavesdropped on other species' calls for information beneficial to their survival. With this major shift in our reasoning, we scoured through the UCLA Library's systems in search of previous research on eavesdropping, particularly between different species of animals and in regards to an alarm call, which is emitted in the presence of danger. We relied heavily on the BOL proxy server, Google Scholar, and Web of Science. We were extremely grateful and relieved to see the UC e-Links giving us access to pertinent journals and articles for our study. It eased our search by providing us with the PDFs directly, especially on an island with slower internet access. On Moorea, a couple other research problems came up. Each time, our troubles were alleviated by resources from the UCLA Library Collections. Our last week on the island consisted of a consistent downpour, preventing us from conducting experiments. We spent seven days indoors, writing up our final paper with the aid of the UCLA Library databases.

After three weeks abroad, we came back to UCLA sunburnt and ridden with mosquito bites, but with a renewed appreciation for the resources our school library system offers. We are extremely proud of our final research paper, which we have sent to an animal behavior journal for review. Our achievement was built on the foundation provided by the UCLA Library. Even though we were not physically at UCLA for a majority of our quarter, we found the library extremely influential to our project's success. UCLA Library has provided us with very useful tools that aided in our quest for knowledge and our drive for scholarship.

Abstract

Many species benefit from listening to the vocalizations of their predators as well as the alarm vocalizations of other species. This eavesdropping is an important way to acquire information of predator location and threat magnitude. Eavesdropping is commonly studied in mammals and birds, and it has only recently been reported to occur in reptiles. Studies that examine lizard responses to playbacks of both predatory calls and heterospecific alarm calls are absent, even though eavesdropping may be especially important in non-vocal species. We broadcast predator vocalizations, alarm calls from a non-predatory bird (red-vented bulbul, *Pycnonotus cafer*), and social vocalizations from red-vented bulbuls to determine if non-vocal white-bellied copper-striped skinks (*Emoia cyanura*) could discriminate between them. Upon hearing red-vented bulbul alarm calls, white-bellied copper-striped skinks reduced their rate of looking compared to a baseline period. However, they did not respond significantly to red-vented bulbul social calls or vocalizations from their potential predators. Pairwise analyses revealed that upon hearing red-vented bulbul alarm calls, skinks reacted significantly differently than when they heard social calls or predatory calls. Our study is the first to look at the responses of both predator and

heterospecific alarm call playbacks in lizards. White-bellied copper-striped skinks most likely depend on heterospecific vocalizations for predator information because they are non-vocal and found low on the forest floor, making it harder to identify predators directly than through alarm calls of avian heterospecifics.