Responses of Small Birds to a Screech Owl Call in Different Regions in North Carolina

Jennifer Richter

UNC Charlotte Summer Ventures in Science and Mathematics Program

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Instructor Michael J. Baranski

Assistant Katie Bender

Abstract

To study the varying responses of small birds to the call of the Eastern Screech Owl, records from ten mobbing trials across different regions in the state of North Carolina were analyzed. The analysis was made in an attempt to correlate the different reactions of the small birds with physiographical region in which the mobbing trial was conducted. It was discovered that small birds of the coast and sandhills had a more agitated response to the call of the Screech Owl than small birds in the mountains and piedmont.

Introduction

Over the last ten years the Field Biology and Ecology class in the Summer Ventures Program at UNC Charlotte has conducted bird mobbing trials across the state of North Carolina. Mobbing is a response of small birds to the presence of a predator in the area (Gehlbach 1995). When the call of the Screech Owl is audible, small birds will often mob together in order to defend themselves, their territory, and their young (Coe 2001). The Eastern Screech Owl is a raptorial bird and poses a threat to the small birds that comprise the owl's diet (Audubon 2007). The Screech Owl is typically found in open woodlands, groves, towns, forests, and parks (Wernert 1998). This wide range of suitable habitat allows the Screech Owl to thrive in much of the southeast (Alden 1999). The owl nests during the day in hollowed out stumps or old woodpecker cavities and is rarely seen by people throughout the day (Coe 2001). This makes it difficult to visually determine whether or not there is a Screech Owl in the area, but bird behavior during mobbing trials can typically provide clues as to whether or not a Screech Owl inhabits the area. An intense response to the call of the owl may alert bird watchers that the community of birds understands the threat that the Eastern Screech Owl poses and that they are prepared to defend themselves. Only a slight change in response from the control to the experimental trial may indicate that the Screech Owl is not a predominant force in the environment and the birds are unfamiliar with the potential danger that comes with the presence of the Screech Owl.

This research is being conducted to test whether or not geographical region affects the responses of small birds to the call of the Eastern Screech Owl. The habits and behaviors of birds are adapted in the

diverse habitats in which they live. Small birds develop different responses according to their environment because they are forced to face a different set of situations and threats. North Carolina has four distinctive regions in which birds dwell: the mountains, the piedmont, the sandhills, and the coastal plain. Each of those regions is comprised of its own diverse ecosystems and the birds that dwell in each area may react differently to survive.

Materials and Methods

Mobbing trials using the call of the Eastern Screech Owl were conducted in different regions of the state of North Carolina. Each trial was conducted in an area with its own unique ecosystem and unique niches for various birds to fill. Mountain locations for the mobbing trials were carried out along the Blue Ridge Parkway in areas such as Julian Price Park, Rich Gap, and at Mt. Mitchell State Park. Piedmont trials often took place at Reedy Creek Preserve in Mecklenburg County. The Longleaf Pine forests of Weymouth Woods were repeatedly the location of mobbing trials in the sandhills and trials along the coast were conducted at the Green Swamp Nature Preserve, Carolina Beach, and Singletary Lake.

The mobbing trials were conducted using tape recordings of the Red-Eyed Vireo and the Eastern Screech Owl. The Red-Eyed Vireo established a controlled response of small birds to the presence of a nonthreatening species. A tape recording was placed in a chosen environment while observers, armed with binoculars and a bird guide, spaced themselves out in every direction from the tape player. The song of the Red-Eyed Vireo was played continuously for ten minutes while onlookers noted activity and attempted to identify the species of birds that were visually or audibly responding. After ten minutes the Red-Eyed Vireo was replaced by the recording of the Eastern Screech Owl. With the expectation of a more agitated response, the owl call was played for ten minutes and activity was again recorded. Upon completion of the mobbing trial, notes were compiled to develop an accurate data set.

To compare and analyze the change that took place during the mobbing trial from Red-eyed Vireo control to the Eastern Screech Owl, a response index system was devised. Ten mobbing trials were

conducted and studied for this research, and after reviewing their results, each trial was given a number on a scale of one through five. A value of one shows that very little change took place between the controlled ten minutes of the Red-eyed Vireo and the experimental ten minutes of the Eastern Screech Owl. A value of five indicates that great change occurred between the controlled and experimental sections of the mobbing trial. These numbers do not measure the amount of birds, but the degree of change in reaction, so a number that is lower on the scale does not necessarily mean that fewer birds approached during the call of the Screech Owl; it could simply mean that just as many birds were drawn towards the call of the Red-eyed Vireo. With the data set from the developed response index, a chi-square test was calculated to determine whether or not the different responses in each physiographic region were significant.

Results

While Table 1 and Table 2 illustrate birds that were observed during mobbing trials in North Carolina, Table 3 totals the birds that were observed and recorded in each region during the control and experimental trials. Table 3 utilizes the one through five response index and assigns an overall value of change in each region. The individual trials in each region were also given one through five values which, for the most part, stayed consistent in each region. Table 4 separates each region into each individual trial and assigns a value for different locations in each physiographic region. Table 4 shows the increased variation in the sandhills and coastal plain while results from the mountains and piedmont stay pretty consistent between control and experimental. The response index was used in a chi-square statistical test, and even though there appears to be a huge difference in the number of birds that responded, the results of the test concluded that the response changes were not significant. At $p= 0.05$ and $d.f.= 3$, a critical value stands at 7.815. The results of the chi-square test for the response index of the mobbing trials only reached 5.83. Although the variation shown in Table 3 demonstrates a large difference in the number of birds responding to the Red-eyed Vireo and Screech Owl in the coast versus

the number that responded in the mountains, the chi-square test determined that the difference was not significant.

The mountain and piedmont trials attracted many species of small birds, as shown in Table 3, but these birds were present during both the control and the experimental trials. Because of that it cannot be said that they were responding specifically to the call of the Eastern Screech Owl. In the sandhills and along the coast, very few small birds were attracted to the call of the Red-eyed Vireo when compared to the overwhelming number drawn to the Eastern Screech Owl call.

Table 1. A list of birds that were commonly attracted to the site of a mobbing trial.

Commonly Attracted Birds During Mobbing Trials	
American Crow	Great Crested Flycatcher
Brown-headed Nuthatch	Mourning Dove
Carolina Chickadee	Northern Cardinal
Carolina Wren	Red-eyed Vireo
Eastern-wood Peewee	Song Sparrow
Eastern Towhee	Tufted Titmouse
Gray Catbird	White-breasted Nuthatch

Table 2. A list of birds that were infrequently present at the site of mobbing trials.

Uncommonly Attracted Birds During Mobbing Trials	
American Goldfinch	Indigo Bunting
American Robin	Mockingbird
Blue Jay	Pine Warbler
Blue-gray Gnatcatcher	Red-headed Woodpecker
Brown Thrasher	Ruby-throated Hummingbird
Chestnut-sided Warbler	Summer Tanager
Chimney Swift	Yellow-billed Cuckoo
Dark-eyed Junco	Yellow-bellied Sapsucker
Downy Woodpecker	Yellow Warbler
Fish Crow	Yellow-throated Warbler
Hairy Woodpecker	Wood Thrush

Table 3. Bird numbers at the site during the control and experimental trial and the value assigned using the 1-5 number system.

Total Species Found in Regions			
	Control	*Experimental*	1-5 Scale of Change
Coastal Plain (3 trials)	7	46	5
Sandhills (2 trials)	11	21	3
Piedmont (2 trials)	18	23	1
Mountains (3 trials)	23	24	1

Table 4. Response index during individual trials in the physiographic regions..

COASTAL PLAIN		SANDHILLS		PIEDMONT		MOUNTAINS	
Location	*Scale Value*	*Location*	*Scale Value*	*Location*	*Scale Value*	*Location*	*Scale Value*
Carolina Beach	3	Weymouth Woods Nature Preserve	4	Reedy Creek Preserve	1	Rich Gap	1
Green Swamp Nature Preserve	5	Weymouth Woods Nature Preserve	1	Reedy Creek Preserve	2	Julian Price Park	1
Singletary Lake	5					Mt. Mitchell State Park	1

Figures 1 through 3 show the change in responses from the control to the experimental in three species of birds that were frequently seen in mobbing trials. Figure 4 illustrates the change in response of the Chimney Swift which was only present in the piedmont. The graphs show the number of species that responded to the control and to the experimental trials in four regions of North Carolina. These figures support the data in Table 3 showing more deviation between control and experimental trials in the eastern part of the state than in the western part.

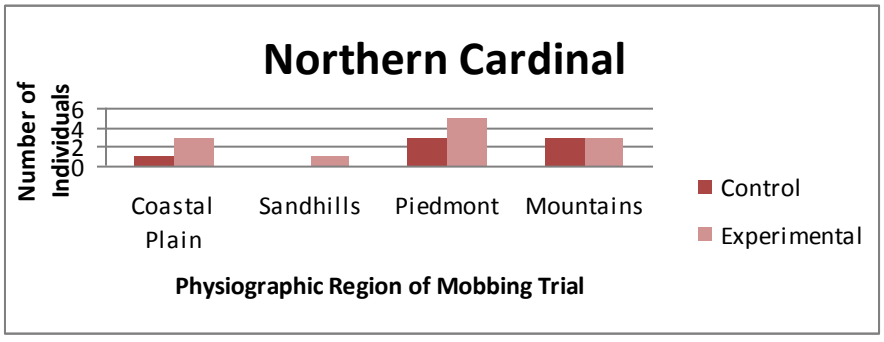

Figure 1. Number of Northern Cardinals that arrived during the control and the experimental mobbing trials.

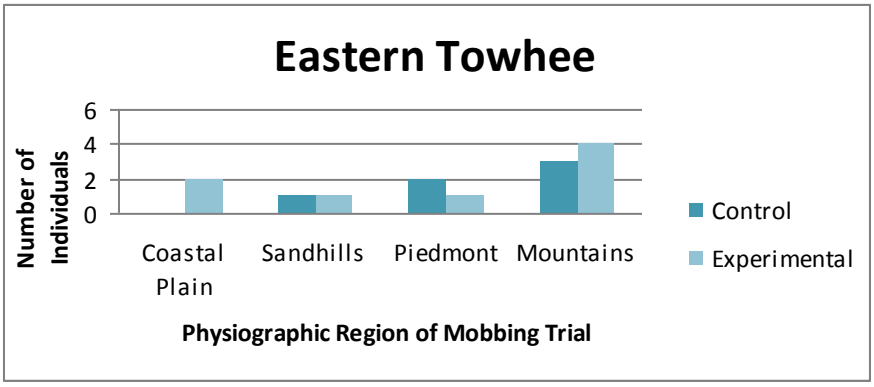

Figure 2. Number of Eastern Towhee that arrived during the control and experimental mobbing trials.

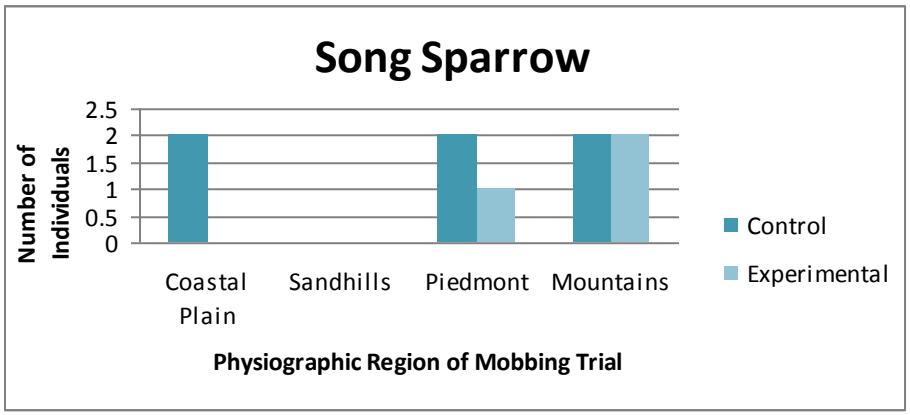

Figure 3. Number of Song Sparrows that arrived during the control and experimental mobbing trials.

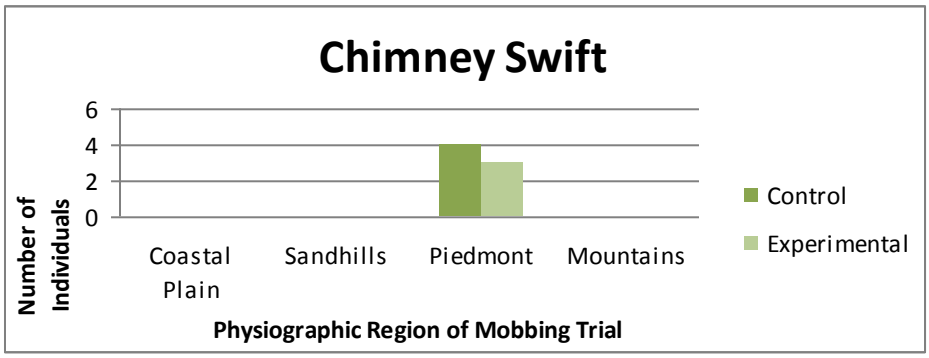

Figure 4. Number of Chimney Swifts that arrived during the control and experimental mobbing trials

Discussion and Conclusion

The research and analysis seem to support the hypothesis that variation in mobbing locations does in fact alter the responses of small birds to the call of the Eastern Screech Owl; however the differences were not shown to be statistically significant. Small birds in mountain locations showed very little

concern when the call of a predator species was present in their environment. The small song birds of the mountains were aware of the presence of a fellow bird, but considering that they responded similarly to both the Red-eyed Vireo and the Eastern Screech Owl could lead one to believe that they did not recognize the call or did not feel threatened for some reason. This response was drastically different from the birds in the coastal plain which actually "mobbed" the area with the tape player. The Eastern Screech Owl may not be as prevalent in the mountains and piedmont as it is along the coast which could suggest that the small birds in the mountains and piedmont showed less concern for the owl because they have had less exposure to it and its threatening nature. A lack of Eastern Screech Owls in the mountains and piedmont seems unlikely because these two places offer the habitat in which an Eastern Screech Owl could thrive. These regions offer not only the structure and coverage of lush forests, but also house an abundance of small birds and mammals on which the Screech Owls prey.

There are always outside factors that could skew data and throw off the results of an experiment. These mobbing trials were conducted in different years, at different times of day, and under different weather conditions. The mobbing trials conducted in Weymouth Woods Nature Preserve were set up in the exact same location both years, but they yielded very different results. One of the trials presented the expected mobbing results with a few curious species flying by to look for the source of the call of the Red-eyed Vireo followed by an outpouring of aggressive and agitated behavior upon hearing the Eastern Screech Owl. During a different summer that trial was conducted again in the exact same location, but the results were anything but expected. The control caught the attention of a Yellow Warbler and an American Crow, but the Screech Owl call only resulted in the chirping of several small birds in the distance. It's not as if the same longleaf pine forest was no longer a suitable habitat, but conditions on the two days or even in the separate years could have been very different. One trial could have been conducted right before a storm that the birds knew was coming or the trials could have been carried out during different times of day when the amount of bird activity is not the same. The temperature, wind speed, cloud cover, or even the humidity could have changed the response of the birds, but it seems

strange that a minor environmental change would cause the small birds to disregard their own safety and ignore the call of the Screech Owl. The vitality of the ecosystem in different regions of North Carolina is not steady from year to year. The amount of precipitation could affect the vegetation and the whole structure of an ecosystem which would account for an increase or a decrease in response from the small birds observed in these trials. A drought one year may not only throw off the data for that year, but it could affect an ecosystem and bird population several years later.

Natural variations in ecosystem and weather are not the only things that could affect the results of mobbing trials. If the trials were conducted with noises from a highway in the background or if a lot of civilization was nearby, the wildlife may not be as pronounced as in a natural environment. The call of the Eastern Screech Owl may have been drowned out by the man-made commotion, or the sampling area may not have been in an area with enough untouched habitat. Habitat is very broken up now that more and more land is being developed and less is left for bird species to inhabit. Over the years, the results could be changing as a consequence of over development and the failure to protect valuable habitat. The encroachment of man into the natural habitat of small birds and all other species will change the habitat and structure of a community resulting in a change in data from year to year.

After an analysis of mobbing trials throughout different physiographic regions of the state of North Carolina, it has been determined that region does appear to affect the response of birds to the call of the Screech Owl. However, whether or not it is actually a regional affect, or other factors such as weather or human development play into the results cannot be positively stated.

Acknowledgements

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Chi-square tests were calculated using the methods in Field and Laboratory Methods for General Ecology by James E. Brower et. al. (1997).

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