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Black-Capped Chickadee (Parus atricapillus) Food Preference

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Abstract

All animals must make decisions on optimal foraging. These factors contribute to a species' food preference, such as making decisions on what food to eat based on calories and nutrition. The objective of my study was to examine food preference of black-capped chickadees (*Parus atricapillus*). Birds may rely on calories per seed when choosing food sources. Therefore, I predicted that chickadees eat more black oil sunflower seeds compared to striped sunflower seeds, that the number of chickadees is higher in the presence of black oil sunflower seeds, and there will be more interactions in the presence of black oil sunflower seeds compared to striped sunflower seeds. The results confirmed the predictions that chickadees ate a higher number, higher in presence, and more interactions in the presence of black oil sunflower seeds compared to striped sunflower seeds.

Introduction

All animals must decide where to find, select, capture, and eat food. These factors contribute to food preference, such as choosing what food to eat based on calories, nutrition and net rate energy intake. Optimal foraging theory predicts how an animal behaves when searching for food (Rubenstein & Alcock, 2019). All animals also make decisions based on predation risk by avoiding predators and making trade-offs on time spent searching for, pursuing, and handling food. The objective of my study was to examine food preference of black-capped chickadees (*Parus atricapillus*).

Background

I chose to study black-capped chickadees (*Parus atricapillus*) because I was interested in determining if there was a food preference in the type of seeds they eat. Chickadees are influenced by social interactions, predator cues, and food quality. Chickadees have shown preferences for seed-size, preferring smaller seeds due to bill size (Myton & Ficken, 1967). Thinner shells make it easier for seeds to be opened, therefore, there are more costs in the amount of time spent to find seeds that are thinner shelled. Black oil sunflower seeds contain more nutrition and have a higher protein level than striped sunflower seeds. Therefore, the benefits of eating black oil sunflower seeds are because they are higher in nutritional levels and thinner in shells. Striped sunflower seeds are less nutritional and thicker in shells allowing for more time and energy to be spent when choosing.

Predictions

1. Chickadees eat more black oil sunflower seeds than striped sunflower seeds because of the smaller seed size and more calories (Myton & Ficken, 1967).
2. The number of chickadees is higher in the presence of black oil sunflower seeds compared to striped sunflower seeds because chickadees prefer black oil sunflower seeds.
3. More interactions occur in the presence of black oil sunflower seeds because chickadees prefer black oil sunflower seeds and thus compete for access to them.

Methods

Study Area

I conducted this study in Waldoboro, Maine (44.0953 N, 69.3756 W). The area is an open grass backyard of approximately 743 m^2. I used 2 bird feeders, one on each side hanging on a post where birds such as black capped chickadees, blue jays (*Cyanocitta cristata*), and northern cardinals (*Cardinalis cardinalis*) forage. The open area is surrounded by oak and birch trees.

Data Collection

I allowed chickadees to acclimate to the feeders for 2 days. I placed 130 g each of black oil sunflower seeds and striped sunflower seeds into separate feeders. I watched feeders in 30-min intervals each day for 10 days. I counted the number of birds present at each feeder, and I counted the number of bird interactions. After 2 hr, I weighed the amount of seeds left.

I observed foraging behavior and social interactions of chickadees with other birds, recording the behavior. I recorded the total number of species' interactions, the number of chickadees. Due to the consistently low number of birds present at each feeder at the start of the study, I substituted them for 2 new bird feeders. Data were gathered by the naked eye and with binoculars.

Data Analysis

The independent variable in the study was the type of food presented. The dependent variable was the weight of the remaining seeds, number of chickadees present, and interactive behavior. I used JMP 14 (SAS Institute, Inc., 2018) to analyze the data using the Wilcoxon / Kruskal-Wallis Test and the significance level was $P < 0.05$.

Results

The results show a higher number of seeds remaining of striped sunflower seeds (Mean = 127.5, SD = 1.87, S = 142.5) and a lower number of seeds remaining of black oil sunflower seeds (Mean = 114.4, SD = 8.5, S = 142.5). A larger number of birds were present at the black oil sunflower seed feeder (Mean = 4.6, SD = 2.3, S = 63) and fewer birds present at the striped sunflower seed feeder (Mean = 1.5, SD = 0.7, S = 63). More interactions were present at the black oil sunflower seed feeder (Mean = 2.3, SD = 1.6, S = 68) and fewer interactions were present at the striped sunflower seed feeder (Mean = 0.4, SD = 0.5, S = 68).

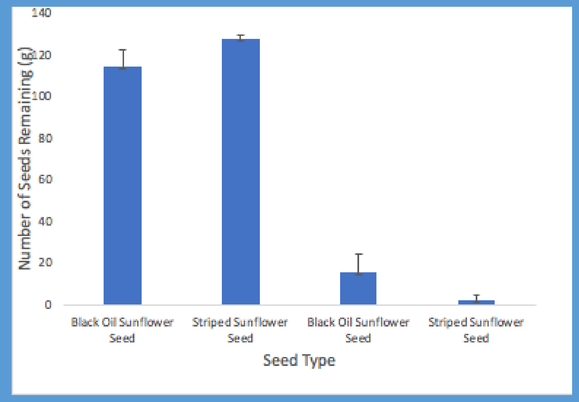

Figure 1. Mean (+ SD) mass of seeds remaining for black oil sunflower seeds and striped sunflower seeds (n = 10 days).

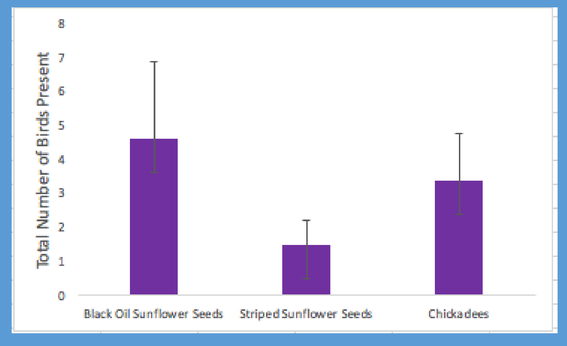

Figure 2. Mean (+ SD) number of birds present at feeders containing black oil sunflower seeds and striped sunflower seeds.

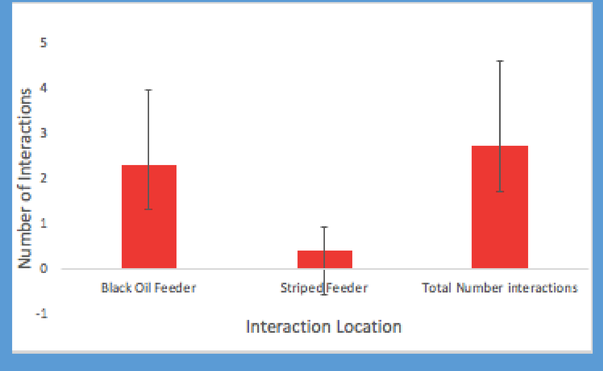

Figure 3. Mean (+SD) number of interactions at feeders containing black oil sunflower seeds and striped sunflower seeds.

Discussion

Prediction 1 was supported. Black-capped chickadees preferred black oil sunflower seeds to striped sunflower seeds, perhaps due to seed size, given that black oil sunflower seed is smaller and easier to unshell compared to striped sunflower seeds. This preference may be due to optimal foraging theory, making decisions based on predation risk by avoiding predators and making trade-offs on time spent searching for, pursuing, and handling food. Chickadees may rely on calories per seed when looking for food sources. Black oil sunflower seeds contain 818 calories compared to striped sunflower seeds containing 584 calories.

Prediction 2 also was supported. More birds were present at the black oil sunflower seed feeder than striped sunflower seed feeder. All birds were counted at the feeders, not just chickadees. More birds may have been present due to their preference for black oil sunflower seeds, perhaps due to a thinner shell and more nutrition. Black oil sunflower seeds contain more protein than striped sunflower seeds, therefore more energy can be obtained by eating black oil sunflower seeds.

Prediction 3 was supported. There was a greater number of interactions for black oil sunflower seeds over striped sunflower seeds. The number of interactions may have varied due to the influence of food quality and the amount of nutrition obtained from the seeds, such as blue jays dominating the feeders, more calories within black oil sunflower seeds, which may affect competition for access to food. Black oil sunflower seeds are higher in quality and birds spent more effort to gain access to them.

I conclude that chickadees prefer black oil sunflower seeds to striped sunflower seeds due to more calories and nutrition and less time needed to handle the food. Concluding that chickadees forage optimally.

Acknowledgements

I thank my grandparents for allowing me to conduct this study at their house and helping in the process. The University of Southern Maine Institutional Animal Care and Use Committee approved this study (30221-01).

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