Name(s)	Project Number
Daria V. Syskine	**S0422**

Project Title

Nonsocial Butterflies: Effects of Social Learning on Flower Foraging in the Nonsocial Cabbage Butterfly (Pieris rapae)

Abstract

Objectives/Goals
The objective of the project was to find out if cabbage butterflies demonstrate social learning and, if so, whether cabbage butterflies learn association tasks faster when observing other butterflies than non-living models, when observing models than scent cues, and with scent cues than individually.

Methods/Materials
Cabbage butterflies were provided with 8% sucrose solution from a yellow plastic flower, training them to forage only from yellow flowers. If butterflies were "demonstrator" butterflies, they were trained to forage only from green flowers.
    The testing arena contained 6 empty yellow flowers and 6 green flowers with 8% sucrose solution. During the testing of each trial group, 5-7 butterflies were released into the arena. For the scent-cue group, three green flowers had been exposed to "demonstrator" butterflies before experimentation. For the visual-cue group, three green flowers were marked with models. For the demonstrator group, three "demonstrator" butterflies, foraging only from green flowers, were released alongside two testing butterflies. The control group had no cues.

Results
The presence of "demonstrators" on green flowers increased the probability that naive butterflies would attempt to forage from a green flower (p=0.0178). This indicates that the cabbage butterfly, a non-social insect, may be capable of social learning. This experiment did not determine which cue prompts social learning, as there was no significant difference in time until first foraging attempt on a green flower for any cue (p=0.0874).

Conclusions/Discussion
These results, combined with earlier experiments demonstrating social learning in non-social organisms, support the argument that social and asocial learning are based on the same mechanisms. This has implications for fields of research which assume that social learning is distinct from asocial learning, such as those which use animal models to study social learning in humans, indicating that conclusions drawn from such studies may not always be accurate.

Summary Statement

This project determined that the cabbage butterfly, a nonsocial organism, is capable of social learning (learning that results from one organism observing and copying another organism).

Help Received

My mentor, Lora Lerner, advised the project; the design, equipment, and procedure were created by me, but based off of procedures found in earlier research articles.