Project Plan

Project Title: Spunky Squirrels of USC: are they really that crazier than expected?

Group Members: Alex Barth, 570L Students

Topic Background Statement:

Optimal foraging theory is a long-standing concept in behavioral ecology (Pike 2019). Essentially, it provides a framework to predict behavior of animals when searching for food. Generally, it is expected that individuals' behavior will reflect a balance of maximizing energy intake while minimizing risk (predation, etc). In an early application of studying OFT in squirrels, Lewis (1982) observed that squirrels exhibited diet preference based on the nutritional composition. While it may be important to acquire certain nutrients, foraging behavior may also be altered when predation is decreased.

In an urban setting, predation pressure on squirrels may be greatly reduced. Additionally, there is a wide range of foods. Thus, squirrels might spend more time defending favorable territory rather than foraging. Avoidance/predation escape will be low because there is low predation.

Main Question(s):

How do squirrels on USC campus spend their time?

Does foraging increase or decrease in an urban environment?

Hypothesis(es):

Squirrels on USC's campus have a wealth of resources between natural and anthropogenic resources and low predation, most of their time will be spent defending favorable areas rather than foraging.

Proposed Methodology:

Squirrels will be observed at common park-like locations around USC's campus.

List of Needed Equipment:

- Stopwatches
- Clipboards
- Pens/paper for ethograms
- Multiple people for observations.

List of Collected Variables:

- Behavior/action (predictive, categorical)
- Number of actions (response, count)
- Time spent on action (response, continuous)

Proposed Analysis Method:

The amount of time spent on each action will be recorded. The proportion of time spent on activities will be recorded as well as the number of individual actions. To test if squirrels spend significantly more time

in conflict than foraging, a chi-square test will be used. This test will compare the observed proportion of time spend to a null model, where time is spent equally on all behaviors.

The sample size for this experiment is unknown as it will depend on how many squirrels' students are able to find. However, presumably it will be relatively small (less than 10). Because squirrel behavior will be pooled across individuals and compared to a null situation, the small sample is likely not an issue. However, if intraspecific variation in behavior is large, then it may lead to questionable results.

Group Member Responsibilities:

Alex: Watch students chase squirrels.

570L Students: Collect, record, analyze the data.

References:

Lewis A. 1982. Selection of Nuts by Gray Squirrels and Optimal Foraging Theory. *American Naturalist*. 107(2): 250-257.

Pike G. 2019. Optimal Foraging Theory: an introduction. *Encyclopedia of Animal Behavior.* 2nd Edition. 111-118.