**Project Title**: Individual variation in antipredator responses of rhesus monkeys

**Species (common names):** Rhesus monkeys  
**Number:** 158  
**Source:** CNPRC

**Procedures:**
Life-like predator models (a leopard and a python) will be shown, and pre-recorded alarm-calls will be played to the monkeys while they are in their home enclosures. Behavioral observations will be made of their responses.

**Special Husbandry Requirements:** Describe any special requirements your animals have with respect to food, water, temperature, humidity, light cycles, caging type, bedding, or any other conditions of husbandry.

None

**Other instructions for animal care staff:** (check applicable entries)

<table>
<thead>
<tr>
<th>Sick Animals</th>
<th>Dead Animals</th>
<th>Pest Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Call Investigator</td>
<td>[ ] Call Investigator</td>
<td>[ ] Call Investigator</td>
</tr>
<tr>
<td>[X] Clinician to treat</td>
<td>[ ] Save for Investigator</td>
<td>[X] OK to use pesticides</td>
</tr>
<tr>
<td>[ ] Terminate</td>
<td>[ ] Bag for disposal</td>
<td>[ ] No Pesticides in animal area</td>
</tr>
<tr>
<td>[ ] Necropsy</td>
<td>[X] Necropsy</td>
<td></td>
</tr>
</tbody>
</table>

**Hazardous Materials (only if in the animal room):**

<table>
<thead>
<tr>
<th>Infectious Agents?</th>
<th>Radioisotopes?</th>
<th>Chemical Carcinogens?</th>
<th>Toxic Chemicals?</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Yes</td>
<td>[X] No</td>
<td>Agent(s):</td>
<td></td>
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<tr>
<td>[ ] Yes</td>
<td>[X] No</td>
<td>Agent(s):</td>
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<tr>
<td>[ ] Yes</td>
<td>[X] No</td>
<td>Agent(s):</td>
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<tr>
<td>[X] Yes</td>
<td>[X] No</td>
<td>Agent(s):</td>
<td></td>
</tr>
</tbody>
</table>
Summary of Procedures:

a) Briefly describe the overall intent of the study. Include in your description a statement of your hypothesis, the objectives and significance of the study. Your target audience is a faculty member from a discipline unrelated to yours. Do not use jargon.

The objective of this study is to determine if differences exist in how individual monkeys respond to predators. I hypothesize that there are “bold” and “shy” individuals, and that these traits correlate with other kinds of behaviors, such as time spent foraging and responsiveness to acoustic and visual stimuli. This study will provide a greater understanding of why behavioral variation exists in primate populations.

b) Procedures employed in this project:

Please check the appropriate boxes if any of these procedures will be employed in your project:

- [ ] Monoclonal Antibody Production **
- [ ] Polyclonal Antibody Production **
- [ ] LD 50 or ID50 studies.
- [ ] Catheters, blood collection, intubation
- [ ] Prolonged restraint (8 hrs+)
- [ ] Fasting prior to a procedure.
- [ ] Food or water restriction
- [ ] Non-recovery surgical procedures
- [ ] Survival surgical procedures
- [ ] Multiple survival surgery
- [ ] Behavioral modification.
- [ ] Aversive conditioning.
- [ ] Special diets; food or water treatment.
- [ ] Induced illness, intoxication, or disease
- [ ] Death as an endpoint (see i below)
- [ ] Trapping, banding or marking wild animals

** If this protocol only describes antibody production, you may use the attached antibody production page in lieu of completing section c below.
c) Describe the use of animals in your project in detail, with special reference to any of procedures checked above. Include any physical, chemical or biological agents that may be administered. List each study group, and describe all the specific procedures that will be performed on each animal in each study group. Use terminology that will be understood by individuals outside your field of expertise. (Note: This cell will expand to whatever length you require. You may make this section as long as you wish, but try to be concise. Some projects may require one or two pages.)

### Pilot Study

Nine groups (each containing 5-10 individuals) of rhesus monkeys, housed in outdoor corn-crib enclosures at the CRPRC, will be used.

I will show the groups of monkeys life-like models of a leopard (Panthera pardus), an Indian rock python (Python molurus), and a brown circle. Each model will be shown once to three different groups. Each group will be shown only one model.

Models will be shown 3 meters from the outside of the enclosure, and will be exposed for 30 seconds. Only one model will be presented per day.

All behaviors will be video- and audio-taped. No physical interactions between humans and monkeys will occur. If individual identification of monkeys is required, natural marks on the monkeys will be used.

### Main Study

Sixty-eight individual rhesus monkeys at the CRPRC (four individuals from each of 17 field enclosures) will be observed. Each individual will also be exposed to a predator model and a recorded alarm call. All observations and experimentation will occur while the animals are in their home enclosures.

Other animals will be present for the presentation, however foci will be chosen from those that respond based on criterion such as age gender and rank. Additionally, The impact of other animals on the focal’s response to the presentation will yield valuable data, and provide for the impact of social influences.

Each animal will be observed for approximately two hours total, and behavioral observations will be recorded. Observations will occur in 30-minute periods for four days for each individual.

After behavioral observations are made, each individual will be shown a life-like model of a leopard (Panthera pardus) or an Indian rock python (Python molurus), and a brown circle. Each monkey will also be exposed to a recorded alarm call of another individual. The two-dimensional leopard model is made of foam board covered with painted cloth, and measures 1.5m in length, and 65cm high at the shoulder. The three-dimensional python model is made of painted, molded foam, and measures 110cm in length and 25cm at greatest diameter. Amplified alarm calls will be played from digital audio-tapes.

The model and alarm call will be presented once to each individual. The models and speakers playing the alarm calls will be placed approximately one meter outside the enclosure. Models will be covered with a camouflage cloth that is attached to 5 meters of fishing line. The model and/or observer will be present at least 30 minutes prior to the presentation of the model or alarm call. When the individual of interest in within 5 meters of the model or speakers, the presentation will be made. Models will be revealed for 30 seconds, and then covered again with the cloth. Alarm calls will be played for 5 seconds. Only one model or alarm call presentation will be made per day.

All behavioral responses to the models and alarm calls will be video- and audio-taped. No physical interactions between humans and monkeys will occur. If individual identification of monkeys is required, natural marks or pre-existing dye marks on the monkeys will be used.

d) Study Groups and Numbers: Define, in the form of a table, the numbers of animals to be used in each experimental group described above. The table may be presented on a separate page as an attachment to this protocol if you prefer. The Normal format should be three columns: Study Group, Procedure, Number of animals. The number of rows should follow from the number of study groups; you may add as many rows as you require. The chart must fully account for the number of animals you intend to use under this protocol. Assign each group to an invasiveness category according to the chart below.
<table>
<thead>
<tr>
<th>Group</th>
<th>Procedures / Drugs</th>
<th>Number of Animals</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Model presentations</td>
<td>~45-90</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Model presentations and alarm call playbacks</td>
<td>68</td>
<td>1</td>
</tr>
</tbody>
</table>

**Categories of invasiveness**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1        | Little or no discomfort or stress  
**Examples:** domestic flocks or herds being maintained in simulated or actual commercial production management systems; the short-term and skillful restraint of animals for purposes of observation or physical examination; blood sampling; injection of material in amounts that will not cause adverse reactions by the following routes: intravenous, subcutaneous, intramuscular, intraperitoneal, or oral. |
| 2        | Minor stress or pain of short duration  
**Examples:** cannulation or catheterization of blood vessels or body cavities under anesthesia; minor surgical procedures under anesthesia, such as biopsies or laparoscopy; short periods of restraint beyond that required for simple observation or examination, but consistent with minimal distress |
| 3        | Moderate to severe distress  
**Examples:** major surgical procedures conducted under general anesthesia, with subsequent recovery; prolonged (several hours or more) periods of physical restraint; induction of behavioral stresses such as maternal deprivation |
| 4        | Severe pain near, at or above the pain tolerance threshold  
**Examples:** exposure to noxious stimuli or agents whose effects are unknown; exposure to drugs, chemicals, or infectious agents at levels that markedly impair physiological systems and which cause death, severe pain, or extreme distress; Surgical experiments which have a high degree of invasiveness. |

Further descriptions of these categories are included in the instructions following this document.

e) **Rationale for species and numbers:** How did you determine that 1) the species choice was appropriate and 2) the number of animals in each study groups was the minimum number necessary to achieve sound scientific results?

Previous research has shown that rhesus monkeys exhibit individual differences in many social behaviors, such as aggressiveness and sociability. This indicates that rhesus monkeys would be ideal candidates for an investigation into individual differences in how they respond to predators. The minimum number of animals needed (n=158) was decided based on the fact that this is a non-invasive strictly observational study, thus a large study set allows for cluster analysis of behaviors.

f) **Surgery:** If the project involves survival surgery, where will the surgery be conducted?

Building:  
Room:  
Who will be the surgeon?


g) **Anesthetics, Analgesics, Tranquilizers, Neuromuscular blocking agents:**

Post procedural analgesics should be given whenever there is possibility of pain or discomfort that is more than slight or momentary. If postoperative analgesics are not to be given, justify the practice under part (i) below.

Provide the following information about any of these drugs that you intend to use in this project.

<table>
<thead>
<tr>
<th>Species</th>
<th>Drug</th>
<th>Dose (mg/kg)</th>
<th>Route</th>
<th>When and how often will it be given?</th>
</tr>
</thead>
</table>

h) **Neuromuscular blocking agents** can conceal inadequate anesthesia and therefore require special justification. If you are using a neuromuscular blocking agent, please complete the following:

Why do you need to use a neuromuscular blocking agent?

N/A
What physiologic parameters are monitored during the procedure to assess adequacy of anesthesia?

N/A

Under what circumstances will incremental doses of anesthetics-analgesics be administered?

N/A

i) Adverse effects:
Describe any potential adverse effects of the experiment on the animals (such as pain, discomfort; reduced growth, fever, anemia, neurological deficits; behavioral abnormalities or other clinical symptoms of acute or chronic distress or nutritional deficiency)

No adverse effects are expected.

How will the signs listed above be ameliorated or alleviated? If signs are not to be alleviated or ameliorated by means of post-operative analgesics or other means, explain why this is necessary.

N/A

Note: if any unanticipated adverse effects not described above do occur during the course of the study, a complete description of those effects and the steps taken to mitigate them must be submitted to the committee as an amendment to this protocol.

Is death an endpoint in your experimental procedure? [ ] Yes [X] No

(Note: "Death as an endpoint" refers to acute toxicity testing, assessment of virulence of pathogens, neutralization tests for toxins, and other studies in which animals are not euthanized, but die as a direct result of the experimental manipulation). If death is an endpoint, explain why it is not possible to euthanize the animals at an earlier point in the study. If you can euthanize the animals at an earlier point, describe the clinical signs which will dictate that an animal will be euthanized.

j) Literature search for alternatives and unnecessary duplication:

Federal law specifically requires this section. You are required to conduct a literature search to determine that either 1) there are no alternative methodologies by which to conduct this class/lab, or 2) there are alternative methodologies, but these are not appropriate for your particular class/lab. "Alternative methodologies" refers to reduction, replacement, and refinement (the three R's) of animal use, not just animal replacement. You must also show that this use of animals is not unnecessarily duplicative of other studies.

UC Davis provides on-line access to a number of databases that can be used to search for alternatives. Visit http://trc.ucdavis.edu/jawelsh/Databases_Med_Vet_Researchers.htm (email: jawelsh@ucdavis.edu) or http://www.vetmed.ucdavis.edu/Animal_Alternatives/main.htm (email: mwwood@ucdavis.edu)

What was the date on which you conducted this search? 7/29/02

List the databases searched or other sources consulted (there should be more than one). Include the years covered by the search.

<table>
<thead>
<tr>
<th>Database Name</th>
<th>Years Covered</th>
<th>Keywords / Search Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropological Literature</td>
<td>1984-present</td>
<td>rhesus monkey, Macaca mulatta, predator, antipredator, primate, snake, leopard, personality, individual variation, individual differences, behavior, behavioral syndrome</td>
</tr>
<tr>
<td>BIOSIS</td>
<td>1993-2002</td>
<td>Same as above</td>
</tr>
<tr>
<td>BIOSIS</td>
<td>1985-1992</td>
<td>Same as above</td>
</tr>
<tr>
<td>Current Contents</td>
<td>1989-present</td>
<td>Same as above</td>
</tr>
</tbody>
</table>
What were your findings with respect to alternative methodologies?

No alternative methodologies were found.

Has this study been previously conducted?  [ ] Yes  [X] No

If the study has been conducted previously, explain why it is scientifically necessary to replicate the experiment.

k) Disposition of animals:  At what point in the study, if any, will the animals be euthanized?

None

l) Methods of euthanasia:  Even if your study does not involve killing the animals, you should show a method that you would use in the event of unanticipated injury or illness.  If anesthetic overdose is the method, show the agent, dose, and route.

<table>
<thead>
<tr>
<th>Species</th>
<th>Method</th>
<th>Drug</th>
<th>Dose (mg/kg)</th>
<th>route</th>
</tr>
</thead>
<tbody>
<tr>
<td>M mulatta</td>
<td>Overdose</td>
<td>pentobarbital</td>
<td>60mg/kg</td>
<td>IV</td>
</tr>
</tbody>
</table>

m) Surplus animals:  What will you do with any animals not euthanized at the conclusion of the project?
Project Roster: Please provide the names of all the individuals who will work with animals on this project. This page will not be made available to the public. Give either the University Employee ID # or a valid UC Davis email address so that we can document training and occupational health compliance for regulatory agencies. Include all investigators, student employees, post-doctoral researchers, staff research associates, post-graduate researchers and laboratory assistants who will actually work with the animals. You don't need to include the staff of the vivarium in which your animals will be housed.

The principal investigator is responsible for keeping this roster current. If any staff is added or subtracted from this project, you must amend the protocol by sending the campus veterinarian a memo describing any changes.

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Middle Name</th>
<th>UC ID Number or SSN</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
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Occupational Health Program:
Supervisors must enroll their employees in the campus Occupational Health Program if the workers are at increased risk of illness or injury (such as allergy, physical injury, or infectious disease) because of their work. Enroll workers by having them complete an "Animal Contact History Form", available from Employee Health Services (phone 752-2330). For further information, visit our web site at [http://ehs.ucdavis.edu/animal/health/](http://ehs.ucdavis.edu/animal/health/) or read the UC Davis Policy & Procedure Manual 290-25.

Training:
Supervisors are responsible for insuring that their employees are adequate trained, both in the specifics of their job and in the requirements of the Federal Animal Welfare Act. EH&S offers free, basic wet labs in laboratory animal handling and techniques, and lecture format classes in the requirements of the Animal Welfare Act. To schedule a class for your unit, contact EH&S at 2-2364. Information is available on the world wide web at [http://ehs.ucdavis.edu/](http://ehs.ucdavis.edu/).
Assurances for the Humane Care and Use of Vertebrate Animals:

Principal Investigator's Statement:

I have read and agree to abide by the UC Davis Policy and Procedure Manual section 290-30 (Animal Use and Care). This project will be conducted in accordance with the ILAR Guide for the Care and Use of Laboratory Animals, and the UC Davis Animal Welfare Assurance on file with the US Public Health Service. (These documents are available from the Campus Veterinarian and at http://ehs.ucdavis.edu/). I will abide by all Federal, state and local laws and regulations dealing with the use of animals in research.

I will advise the Animal Use and Care Administrative Advisory Committee in writing of any significant changes in the procedures or personnel involved in this project.

Principal Investigator

Rank / Title

Date

Committee Use Only Below

** Conditions necessary for Committee Approval:

Final Disposition of this protocol:

_________ Approved

_________ Not Approved

_________ Withdrawn by Investigator

Date of Action: _____ / _____ / _____

I verify that the Institutional Animal Care and Use Committee of the University of California, Davis, acted on this protocol as shown above.

Campus Veterinarian

Date