GRAPHICAL ORGANIZER SPECIFICATIONS
(updated 07/22/2005)

Is hierarchical testing of textbook information more effective than re-reading?

Task: Learn information in a textbook chapter by reading vs. hierarchical testing → 48 hours later, multiple-choice final test over contents of chapter (questions on p. 9).

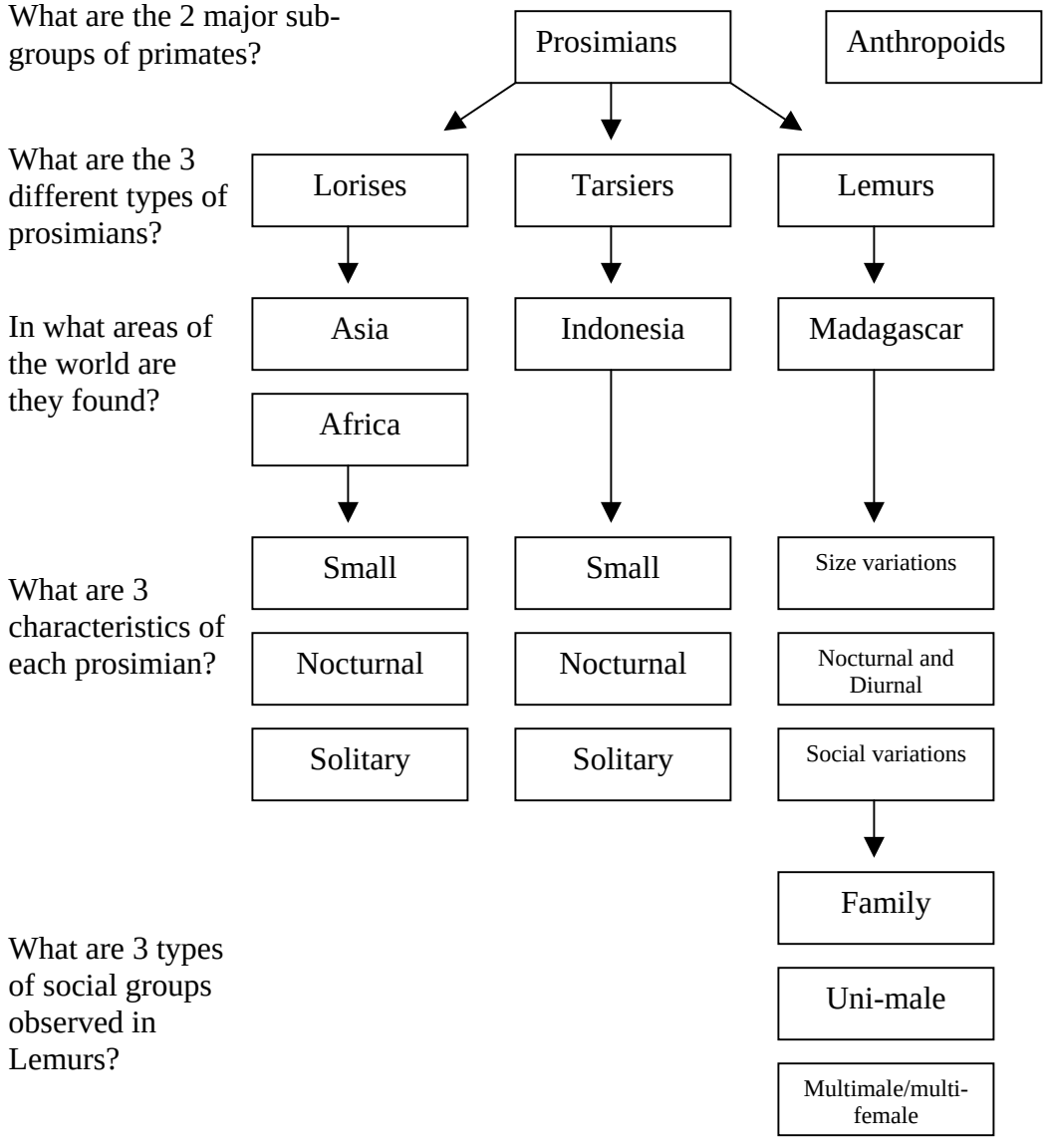
Stimuli: 1-page section from chapter on Biology and Behavior of the Living Primates (see p. 8).

Design:

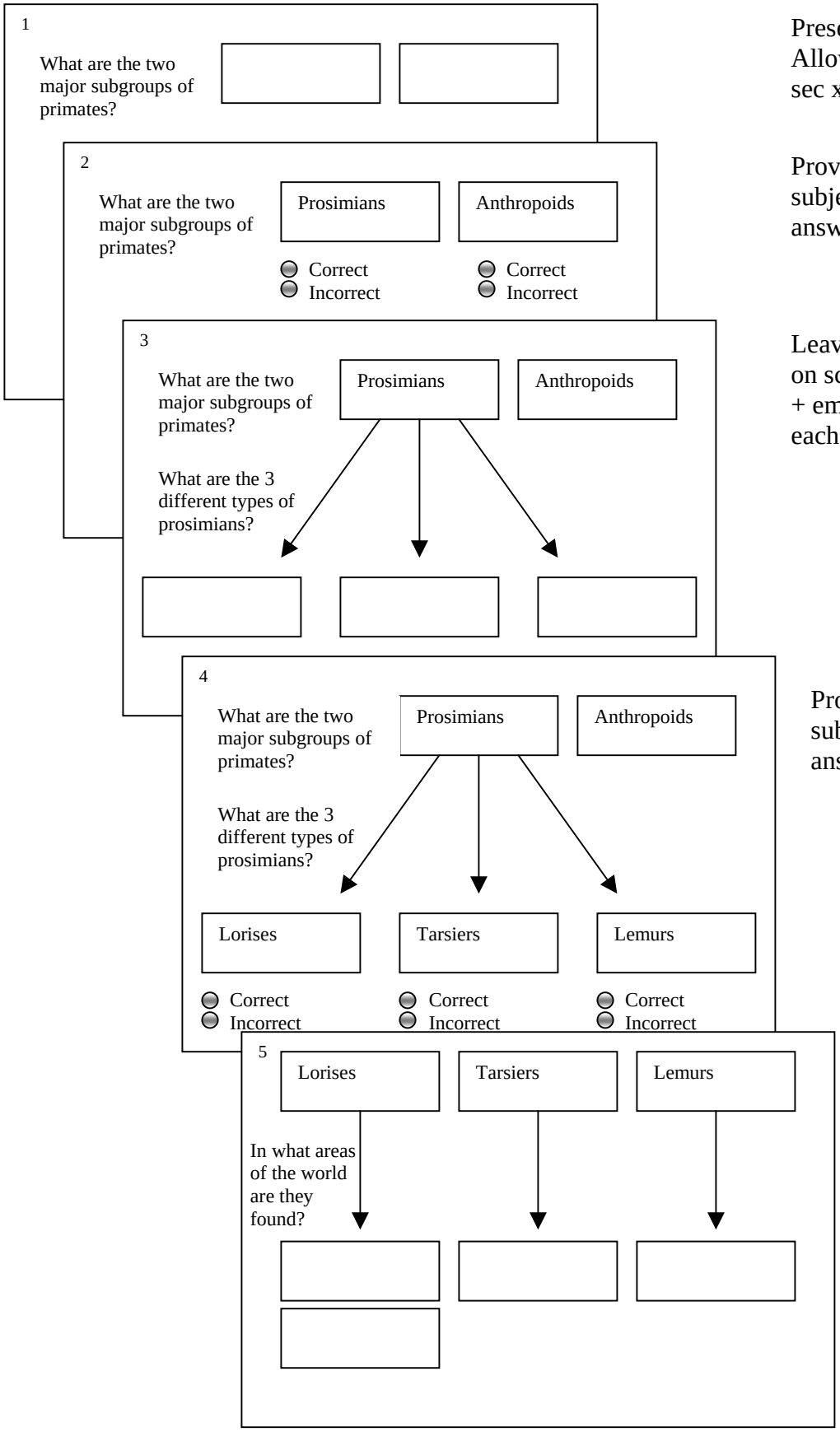
Subjects randomly assigned to one of 2 between-subjects conditions:

(1) Re-read
(2) Hierarchical test

Conceptual diagram for hierarchical test:



Interface diagram for hierarchical test: (numbers on each slide to illustrate example on p. 5)



Present question and empty box(es). Allow 5 sec for each answer (e.g. 5 sec x 2 answers = 10 sec).

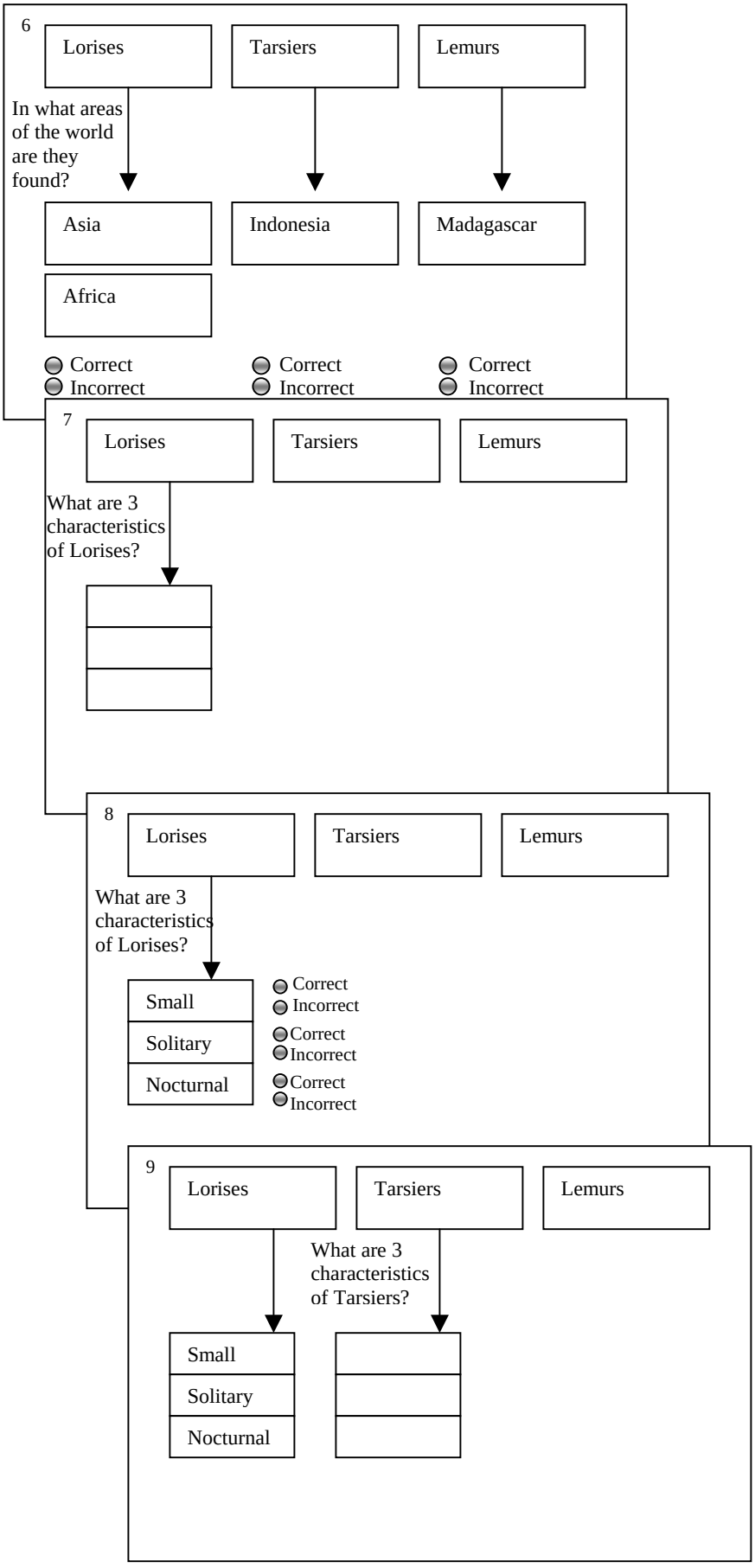
Provide correct answer, and allow subject to indicate whether their answer was correct.

Leave answer to previous question on screen, and display next question + empty box(es). Allow 5 sec for each answer.

Provide correct answer, and allow subject to indicate whether their answer was correct.

Leave answer to previous question on screen, and display next question + empty box(es). Allow 5 sec for each answer.

Interface diagram for hierarchical test, continued:



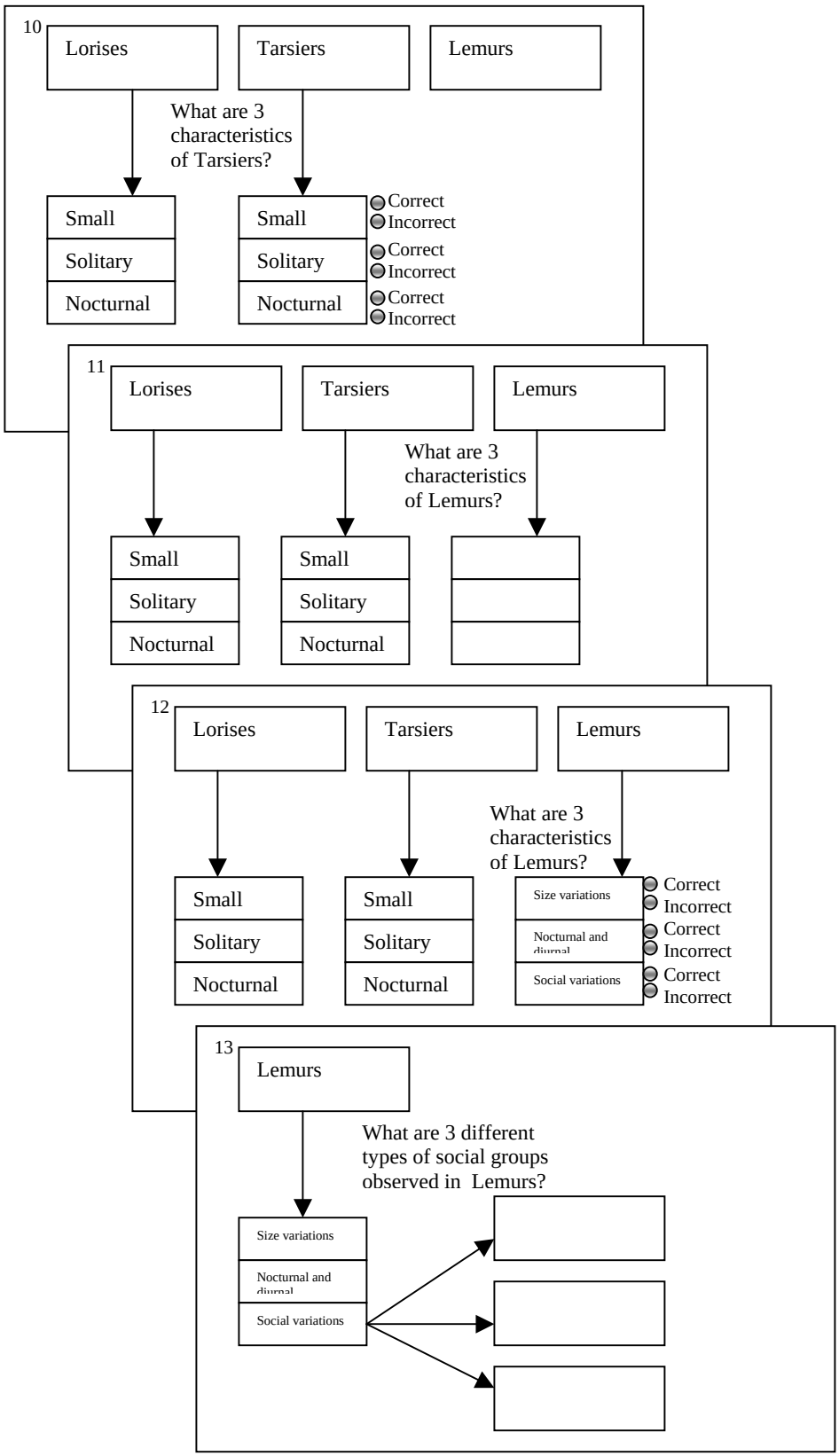
Provide correct answer, and allow subject to indicate whether their answer was correct.

Leave answer to previous question on screen, and display next question + empty box(es). Allow 5 sec for each answer.

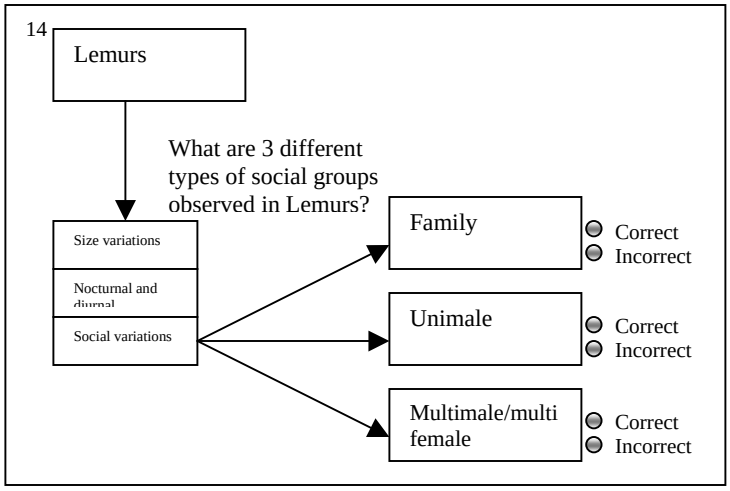
Provide correct answer, and allow subject to indicate whether their answer was correct (one correctness judgment for each of the three answers).

Present correct answers one at a time, followed by correctness judgment.

Interface diagram for hierarchical test, continued:



Interface diagram for hierarchical test, continued:



Present correct answers one at a time, followed by correctness judgment.

Other procedural details:

Each time subject marks answer as correct or incorrect, provide 'continue' button to go on to next question.

For each question after the first one, provide a 3-second lag during presentation of filled-in boxes and next question. E.g. on slide 3, present *Prosimians* and *Anthropoids* for 3 seconds prior to the question *What are three different types of prosimians?*

Log all answers marked as *correct* and *incorrect*. Upon completion of the last question from the hierarchical test, start again from the beginning, providing all answers that were previously marked as correct, and re-testing all answers that were previously marked as incorrect. Continue until all answers marked as correct.

E.g., assume the following were incorrect answers:

1. Anthropoids (slide 1) …….. display *Prosimians* and blank box for *Anthropoids*
2. Tarsiers (slide 3) ……. display *Lorises*, and Lemurs, and blank box for *Tarsiers*
3. Indonesia (slide 5) …….. display *Asia, Africa* and *Madagascar,* and blank box for *Indonesia*
4. Small (slide 7) ……. display *Lorises, Tarsiers* and *Lemurs*, and blank box for *small*
5. Solitary (slide 7) ……. display *Lorises, Tarsiers* and *Lemurs*, and blank box for *solitary*
6. Nocturnal (slide 7) …….. display *Lorises, Tarsiers and Lemurs*, and blank box for *nocturnal*
7. Small (slide 9) ……. display *Lorises, Tarsiers* and *Lemurs*, and blank box for *small*
8. Solitary (slide 9) ……. display *Lorises, Tarsiers* and *Lemurs*, and blank box for *solitary*
9. Nocturnal (slide 9) …….. display *Lorises, Tarsiers* and *Lemurs*, and blank box for *nocturnal*
10. Size variations (slide 11) …….. display *Lorises, Tarsiers* and *Lemurs*, and blank box for *size variations*
11. Nocturnal/diurnal (slide 11) …. display *Lorises, Tarsiers* and *Lemurs*, and blank box for *nocturnal and diurnal*
12. Social variations (slide 11) …… display *Lorises, Tarsiers* and *Lemurs*, and blank box for *social variations*

13. Unimale (from slide 13) …… display *Lemurs, Size variations, Nocturnal/diurnal, Social variations*, and *Family*, and blank box for *Unimale.*

14. Multimale/multifemale (slide 13).. display *Lemurs, Size variations, Nocturnal/diurnal, Social variations*, and *Family*, and blank box for *Multimale/multifemale*.

Instructions:

Instructions 1: (before starting experiment)
In this experiment, we are going to try and teach you some facts about primates. On the next screen is a one-page passage from a chapter on the Biology and Behavior of the Living Primates. Today we would like you to try and learn the information from the chapter page, and two days from now, we will give you a test over this information.

Please read the page carefully just one time, and click 'Finished' when you are done.

Instructions 2: (before hierarchical test condition)
Now we are going to quiz you over the information you read from the chapter page. On the next screen you will see a series of questions, and we would like you to try and recall the answers to these questions. You do not need to type anything in, just try to recall in your mind the answer to each question you see. You will be given only a few seconds to recall each answer, so please try to remember the answers quickly.

After the time limit has elapsed, we will show you the correct answer. If you were successful in recalling the correct answer within the time limit, please press the "Correct" button next to the answer. If you were not successful in recalling the correct answer within the time limit, please press the "Incorrect" button next to the answer.

During the test two days from now, you will be given $.15 for every answer you get right. So please do your best to learn the information.

Click 'Continue' to begin.

Instructions 3: (before re-read condition)
Now we are going to give you another opportunity to study the information you read from the chapter page. On the next screen you will see the same chapter page again, and you will be given xx[*] minutes to learn the information as best you can.

During the test two days from now, you will be given $.15 for every answer you get right. So please do your best to learn the information.

Click 'Continue' to begin.

Instructions 4: (end of Session 1)
That's the end of Session 1. Please return in two days to complete Session 2 of the experiment. Session 2 will last only a few minutes, and both sessions must be completed in order to receive compensation.

[*] Timing for study trials: Alternate running subjects beginning with Test Trial, then Study Trial (e.g., subjects 1, 2, 3, 4, 5, and 6 are assigned to T, S, T, S, T, and S). Base total time for Study Trial on how long it took previous subject to complete Test Trial. Do this for each 'pair' of subjects (e.g., duration of Study Trial for subject 2 is same as Test Trial for subject 1; duration of Study Trial for subject 4 is same as Test Trial for subject 3; duration of Study Trial for subject 6 is same as Test Trial for subject 5).

Instructions 5: (before final test)
Now we are going to quiz you over the information you learned 2 days ago when you read the chapter about the Biology and Behavior of the Living Primates. On the next screen, you will see several multiple-choice questions that pertain to the chapter page. Please read each question carefully, and choose an answer by clicking one of the four choices.

You will be given $.15 for every answer you get right.

Click 'Continue' to begin.

Subjects: 20 undergraduates (10 in each condition) complete online experiment in lab.

THE BIOLOGY & BEHAVIOR OF THE LIVING PRIMATES

We can better understand the place of humans in nature by first understanding the group of mammals to which humans belong—the primates. Humans are primates, as are other creatures such as apes and monkeys. This chapter looks more closely at the biology and behavior of the living primates, with particular attention to the prosimians.

SUB-GROUPS OF PRIMATES

Today, *prosimians* and *anthropoids* are the two major subgroups of living primates. These two major subgroups are further broken down into specific examples of primates that are classified according to their biological, structural, and social variations.

PROSIMIANS

Prosimians are the most primitive form of primates. They are usually small in size, tend to be solitary, and many are **nocturnal**—active only at night. There are three different groups of prosimians in the word today. One group, the **Lorises**, are small, solitary, nocturnal prosimians found in Asia and Africa (Figure 1). Another group, the **Tarsiers**, also small, solitary, and nocturnal, are found in Indonesia. The nocturnal nature of tarsiers is evidenced by their large eyes, the size of which serves to gather available light (Figure 2).

Figure 1. *A loris from Southeast Asia.*

Figure 2. *A tarsier from Southeast Asia.*

The most biologically diverse group of prosimians is the **Lemurs** (Figure 3), which are found only on the island of Madagascar off the southeast coast of Africa. Some species of lemurs are nocturnal and some are **diurnal**—active during the day. Social structure is highly variable among the lemurs: some have the family group structure, some have the uni-male group structure, and some have the multimale/multifemale group structure. Other characteristics, such as body size, diet, and group size, are also variable among lemurs. Their wide range of biological and behavioral characteristics probably reflects their isolation on the island of Madagascar. Because the island has no competing monkey or ape species and not many other mammals either, the lemurs have expanded into a variety of ecological niches. Apart from these variations, the lemurs are still definitely prosimians—having more primitive features than monkeys, apes, or humans.

Figure 3. *Ring-tailed lemurs from the island of Madagascar.*

ANTHROPOIDS

The anthropoids are the higher primates which are generally larger in overall body size, have larger and more complex brains, rely more on visual abilities, and show more complex social structures than prosimians. Almost all anthropoids are diurnal. The anthropoids include **arboreal**—tree-dwelling, species and **terrestrial**—ground-dwelling, species. Anthropoids include monkeys and **Hominoids**—apes and humans.

Final Test Questions: randomize order for each subject

1. What type of prosimian is found in more areas of the world than other prosimians? (Correct = A)
    a) Lorises
    b) Tarsiers
    c) Lemurs
    d) Monkeys

2. What type of prosimian is the most biologically diverse? (Correct = C)
    a) Lorises
    b) Tarsiers
    c) Lemurs
    d) Monkeys

3. According to the chapter, why is one group of prosimians more biologically diverse than the other groups? (Correct = B)
    a) They have lived in more areas of the world
    b) They have not lived around other primate species
    c) They have competed with each other for food resources
    d) They have developed different ways to avoid predators

4. In what way are Lemurs and Lorises alike? (Correct = D)
    a) Both are primarily nocturnal
    b) Both are primarily solitary
    c) Both are found in or near Asia
    d) Both are found in or near Africa

5. In what way are Lorises and Tarsiers *not* alike? (Correct = A)
    a) Lorises are found in different areas of the world than Tarsiers
    b) Lorises are larger than Tarsiers
    c) Lorises have more complex social groups than Tarsiers
    d) Lorises can be diurnal, whereas Tarsiers are nocturnal

6. What is one major difference between prosimians and anthropoids? (Correct = B)
    a) Anthropoids have tails and prosimians do not
    b) Anthropoids are more closely related to humans than prosimians
    c) Anthropoids are more arboreal than prosimians
    d) All of the above

7. In what way is a Lemur more similar to an anthropoid than a prosimian? (Correct = C)
    a) Lemurs are found in the same part of the world as anthropoids but not prosimians
    b) Lemurs are more similar in appearance to anthropoids than most prosimians
    c) Lemurs have more complex social structures than most prosimians
    d) Lemurs are more intelligent than most prosimians

8. In what specific group of primates do humans belong? (Correct = D)
    a) Arboreans
    b) Prosimians
    c) Apes
    d) Hominoids