Cognitive Foundations

Setting up a Simple Experiment

Solution

1. Formulate H_0 and H_1 for the main experiment: What predictions with respect to reading times does a modular account make, what predictions does an interactive account make?

   Answer: Under the first hypothesis, you would predict longer reading times at the onset of the prepositional phrase in *"The doctor cured by..."* than in *"The patient cured by..."*. Alternatively, if syntactic processing strictly precedes semantic interpretation, the reading times for both sentences should be equal.

2. Find four items (four verbs and four pairs of nouns) you could use as materials, such that when in company of the given verb, one noun should intuitively be rated high and one rated low.

   For example:
   evaluate: committee, proposal
   study: student, text
   shoot: hunter, deer
   invite: organizer, guest

3. With a t-test, check whether the lexical frequency of the two nouns with the verb is overall equal for the two conditions.

   See file frequencies.xls

4. Using a "latin-square", create the lists for presentation of the stimuli to the participants.

   See file materials.xls

5. Then create fillers to intersperse between your items so participants won't be able to guess what the experiment is about.

   When you create fillers, it is important to try to vary the structure of the sentences to mask the objective of the study. In this case, there are several possibilities to continue after the sentence onset "How likely is it…": for example, "…to…", "…that…", or the subject of an embedded clause. In this case, you should also try to choose similar numbers of very probable, completely improbable and neutral questions. Here are some examples:

   How likely is it to find a seashell on the beach?
   How likely is it to see a clown at the circus?
   How likely is it that it will snow on Christmas?
   How likely is it that a cure for cancer will be found?
   How likely is it that a smoker will develop cancer?
   How likely is it to find a worm in an apple?
   How likely is it there will be a solar eclipse next year?

How likely is it to win in the lottery?
How likely is it the world will end next week?
How likely is it someone you know has the same birthday?
How likely is it to get a phone call from an old friend?

These include 4 continuations in "…to…", 3 in "…that…" and 3 embedded clauses, and something like 3 very likely, 3 very unlikely and 4 neutral sentences, depending on your own assessment of the events.

6. Finally pseudo-randomize the lists to avoid effects of presentation order.

First, randomize items and fillers separately. Then create "templates" indicating when to show a filler and when to show an item. Here, you might have a list of lines marked "Filler-Filler-Filler-Filler-Item-Filler-Filler-Item-Filler-Filler- Item-Filler-Filler- Item-Filler".

A simple and quick way to randomize lists in a spreadsheet: Add a column of random numbers, then sort the according to these numbers.

Ideally, you would create one list per person, although often not quite that many are used.

See file materials.xls (one list per group of subjects".