Name:

Constraint-Based Models and the Ambiguity Advantage

Tutorial 9

The model files

- The model files that you will need are in:
  `/proj/courses/comppsych/Tutorial9/`
  Copy the entire directory to your account

In this tutorial we will conduct a series of simulations to investigate whether the Competition-Integration Model (CIM) can predict the ambiguity advantage.

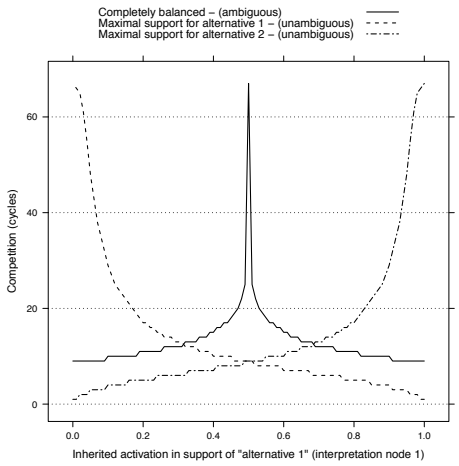
1. An ambiguity advantage on a per-item basis

In the lecture, evidence was presented that shows that the CIM **cannot predict** an ambiguity advantage on a per-item basis. We are now going to (partially) replicate this evidence.

a) G&M sampled the starting biases for the pre-critical region of the VG materials from an $N(0.5,0.1)$ distribution. Open `pre-critical.pl` and specify a model that instantiates an item from these materials (note: you can solve this by reasoning or by calling `rnorm(1,0.5,0.1)` in R). Now, run the model (see previous lecture), and compute and write down the established biases that will be inherited in the critical region.

b) Now make three copies of the file `pre-critical.pl`: `critical_aa.pl`, `critical_np1.pl`, and `critical_np2.pl` (by using the `cp` command, e.g., `cp pre-critical.pl critical_aa.pl`), and specify the critical region models for respectively the ambiguous, NP1-attachment, and NP2-attachment continuations. Note: The weight mass is evenly divided between inherited and novel constraints (i.e., in this case 50/50). Run these models, and write down the cycles for each of the conditions; do they match the graph presented in the lecture? And, do your results confirm that the CIM does not predict an ambiguity advantage on a per-item basis?

c) We have now replicated the simulations for a single point on the x-axis of the graph below. Describe procedurally how we could construct the entire graph.



d) If we wanted to construct this graph using steps along the x-axis of 0.01, how many models would we need to run?

2. An ambiguity advantage when averaging over items

In addition to evidence that the CIM cannot predict an ambiguity advantage on a per-item basis, we have seen evidence that it **can predict** an ambiguity advantage when averaging over items. Let's (partially) replicate those results.

a) Make sure you have written down the cycles for each of the conditions in (1b). Open `pre-critical.pl` and modify it such that it represents an item that biases it in the other direction. Run this model, and update `critical_aa.pl`, `critical_np1.pl`, and `critical_np2.pl` to reflect the established bias. Run these models, and write down the cycles per condition. Now, average these cycles with those found in (1b); do you find an ambiguity advantage?

b) Do the averages that you find correspond to those found by G&M?

	Simulation 1	Simulation 2	Simulation 3
Ambiguous	12.1	11.4	11.6
NP1-attachment	23.8	26.5	23.23
NP2-attachment	22.8	21.5	24.7

If there is a discrepancy, can you explain where this might stem from? Hint: think about what it means to sample from a normal distribution.