Optimality Theory and Cognitive Science (seminar)

LING 228 01 / 628 01
Written response #1
Due: March 04, 2014

The goal of this *written response* is to formally check that you have done the readings, as well as to deepen your understanding thereof. Your response can be submitted either on paper or in email, but please avoid hand-written answers.

Problem: Data structures and architecture for an OT-like "mental software"

Suppose the following working hypothesis: the human mind runs a program written in an object oriented programming language (e.g., Python or Java), which implements Optimality Theory. How would this program be built up?[1]

Without necessarily writing the code, present a **draft** of some solution. What kinds of objects (classes) would you have, and what methods would they need? What data structures would you use? What would you hardwire in your software, and what would you leave open? Are there parameters that you (as a scientist) would not hard code because you do not know their value, but you expect the human brain to do so? Moreover, what would be the entire "architecture" like (input, output, etc.)? Finally, which is the domain you have in mind, when answering this question: segmental phonology, all of phonology, all of linguistics, all of higher cognition?

Please write up your answer in approximately 2-3 pages as a scholarly prose, possibly including (pseudo-)codes, bullet points, etc. Please also include a bibliography according to academic standards. (All bibliography styles are fine, but you should be consistent.) A possible approach is to see yourself as writing the documentation of some software.

You should primarily base yourself on Chapter 12 of *The Harmonic Mind*, amply referring to it. Secondarily, references to other chapters and articles read together are also hoped for, while further references—depending on your scholarly background—will be highly evaluated.

Most of the literature we have read, introduce the basic concepts of OT using a mathematical formalism. And yet, cognitive science views the human mind/brain as a computer, and not as a mathematical construct. This is why I am asking you to translate OT from math to computer science.

When evaluating your answers, I will focus on how well you have conceptually understood the basic building blocks of Optimality Theory, as presented by "mainstream OT" in theory, even if it might vary from their implementations in everyday scholarly practice. Alternative approaches are also highly esteemed.

[1] Note that this hypothesis departs from the hypothesis underlying the ICS Architecture: in what respect?