Some philosophical choices within cognitive modelling (2)

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Today's goals

To look at some of the choices that are made in cognitive modelling and the implications that flow from them.

available at:
https://sites.google.com/site/rcspplslinf/publications

[Not in the exam … just if you’re interested in what I do …]
A concrete universal ...

... provides a *conceptual* understanding of the domain in question.

... is a material thing, reached by a far abstraction within the domain.

... still has content, itself.

... has all the richness of the particular.
Completeness and explanation

We can analyze down to the concrete universal.

We can synthesize other aspects of the real world around it, in necessary ways.

Explanation resides in this dialectical view of analysis $\rightarrow$ synthesis.

The goal is completeness, not simplicity.

Parsimony increases with each move towards completeness.
A concrete approach

Some models in science contain a *fictional entity* that seems to play a useful role; many cognitive models contain *exclusively* fictional entities.

A concrete universal is the point in the model at which we can pour in new, material detail.
In a fictionalist approach, things start with the model and tend to end up with the model. Entities in the model map to entities in the world, but the latter are just destinations of these mappings.
In a materialist approach, things start with the real world and end up there too. An understanding of the domain suggests one entity – the concrete universal – that is the essence of the domain.
What is to be done?

We can think of the simple schwa sound as a piece of real speech that, one way or another, mediates everything else in the domain of spoken language.
A concrete approach

A new version of TRACE – *concrete*-TRACE:

[Diagram showing levels: Lexical level, Lexical stress level, Phonemic level, Phonetic input]
Neurophysiology and universals

The *orienting reflex* (Pavlov, 1947; Sokolov, 1963), in which the animal orients to novelty, is perhaps a candidate for a concrete universal in the domain of neurophysiology.
A concrete approach

The division of the visual projection to the cortex and sub-cortex is an attractive candidate for a concrete universal in reading.
Experimental manipulations that play with the relevant concrete universal really do feel like “carving nature at its joints”, as above.
A concrete approach

Developments in statistics reveal pervasive individual differences ...
Philosophical advances (the concrete universal) and data-analytical advances (regression-type statistics) hold out the promise that we can move between the idiographic and nomothetic in revealing ways.
Cognitive Science seems to be moving towards integrating the idiographic and nomothetic.

We may be approaching valuing complexity as much as simplicity.

More is beginning to be understood about the domains we have looked at – vision, attention and memory.

The research paradigms we have looked at – laboratory experiments, computational modelling, impaired processing, imaging – all have something to offer to a richer, more integrated Cognitive Science.
How to revise

Short-answer questions, and a longer (sub-divided question).
Perhaps with one or more partners, look at the slides and your notes.
Be able to say something about the major topics in the slides.
Have a look at the films we watched (all on the www, see References). (Lectures were also filmed.)
Understand the overall points made in the readings listed at the beginning of each lecture.
The References at the end of each lecture are for if you need to check out the meaning of a lecture slide.