Mindreading & Joint Action: Philosophical Tools

Lecture 4: What Is Modularity (or Core Knowledge)?

ButterfillS@ceu.hu

1. Case study: speech

The objects of speech perception are 'the intended phonic gestures of the speaker'[13]

Infants enjoy categorical perception of speech from around four months of age or earlier.[4] Prelinguistic infants' categorical perception is adult-like in the sense that it is subject to complex effects of speaker and context on where perceptual category boundaries fall.[10,11] Infants' categorical perception also plays an important role in language acquisition.[9,14]

Phonological awareness develops slowly over several years, varies systematically depending on their oral language, and is facilitated both by experience with oral language and by learning a writing system.[2]

2. Fodor's modules

1. they are 'the psychological systems whose operations present the world to thought';
2. they 'constitute a natural kind'; and
3. there is 'a cluster of properties that they have in common'[5]

The 'cluster of properties' include:

- domain specificity (modules deal with 'eccentric' bodies of knowledge)
- limited accessibility (knowledge in modules is not usually inferentially integrated with general knowledge).
- information encapsulation (modules are unaffected by general knowledge or knowledge in other modules, i.e. 'top down' processing is limited)
- innateness (the information and operations of a module are genetically specified).

'it seems doubtful that the often long lists of correlated attributes should come as a package ... the process architecture of social cognition is still very much in need of a detailed theory'[1]

3. The 'Computational Theory of the Mind'

'Thinking is computation'[7]

What does a theory of thought have to achieve? How do 'causal relations among propositional attitudes ... typically contrive to respect their relations of content'[6]

'Turing's account of thought-as-computation showed us how to specify causal relations among mental symbols that are reliably truth-preserving'[7]

Computational processes: 'The operations of the machine consist entirely of transformations of symbols; in the course of performing these operations, the machine is sensitive solely to syntactic properties of the symbols; and the operations that the machine performs on the symbols are entirely confined to altering their shapes.'[6]

4. Against the Computational Theory of the Mind

1. Computational processes are not sensitive to context-dependent relations among representations.
2. Thinking sometimes involves being sensitive to context-dependent relations among representations as such (e.g. the relation … is adequate evidence for me to accept that …).
3. Therefore, not all thinking is computation.

'sooner or later, we will all have to give up on the Turing story as a general account of how the mind works'[8]

'the Computational Theory is probably true at most of only the mind's modular parts. … a cognitive science that provides some insight into the part of the mind that isn't modular may well have to be different, root and branch'[8]

5. Modularity and Development

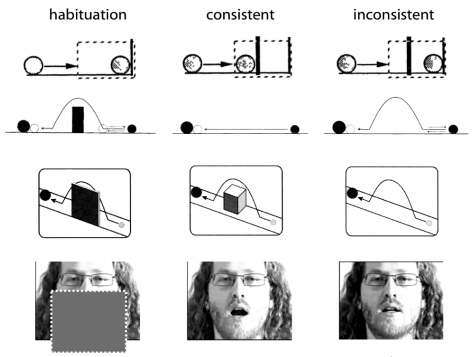
Do modules provide 'a basic infrastructure for knowledge and its acquisition'?[16]

'The module … automatically provides a conceptual identification of its input for central thought … in exactly the right format for inferential processes'[12]

‘The building blocks of all our complex representations are the representations that are constructed from individual core knowledge systems.’[15]

‘core systems are conceptual and provide a foundation for the growth of knowledge’[3]

‘we believe that children’s performance depends on cognitive capacities that are continuous over human development’[?]



Sources Spelke 1991, Gergely, Csibra & Biro 1995, Csibra 2003 p. 125 fig. 6, Mark Steyvers’ web page for PSYCH 140C

References

[1] Adolphs, R. (2010). Conceptual challenges and directions for social neuroscience. *Neuron*, *65*(6), 752–767.

[2] Anthony, J. L. & Lonigan, C. J. (2004). The nature of phonological awareness: Converging evidence from four studies of preschool and early grade school children. *Journal of Educational Psychology*, *96*(1), 43–55.

[3] Carey, S. & Spelke, E. (1996). Science and core knowledge. *Philosophy of Science*, *63*, 515–533.

[4] Eimas, P. D., Siqueland, E. R., Jusczyk, P., & Vigorito, J. (1971). Speech perception in infants. *Science*, *171*(3968), 303–306.

[5] Fodor, J. (1983). *The Modularity of Mind: an Essay on Faculty Psychology*. Bradford book. Cambridge, Mass ; London: MIT Press.

[6] Fodor, J. (1987). *Psychosemantics*. Cambridge, Mass.: MIT Press.

[7] Fodor, J. (1998). *Concepts*. Oxford: Clarendon.

[8] Fodor, J. (2000). *The mind doesn’t work that way : the scope and limits of computational psychology*. Representation and mind. Cambridge, Mass.: MIT Press.

[9] Jusczyk, P. (1995). Language acquisition: Speech sounds and the beginning of phonology. In L. Miller, Joanne & P. D. Eimas (Eds.), *Speech, Language and Communication*. San Diego: Academic Press.

[10] Kuhl, P. K. (1987). The special-mechanisms debate in speech research: Categorization tests on animals and infants. In S. Harnad (Ed.), *Categorical Perception: The Groundwork of Cognition*. Cambridge: Cambridge University Press.

[11] Kuhl, P. K. (2004). Early language acquisition: cracking the speech code. *Nature Reviews: Neuroscience*, *5*(11), 831–843.

[12] Leslie, A. (1988). The necessity of illusion: Perception and thought in infancy. In L. Weiskrantz (Ed.), *Thought Without Language* (pp. 185–210). Oxford: Clarendon.

[13] Liberman, A. M. & Mattingly, I. G. (1985). The motor theory of speech perception revised. *Cognition*, *21*(1), 1–36.

[14] Saffran, J. R., Newport, E. L., & Aslin, R. N. (1996). Statistical learning by 8-month-old infants. *Science*, *274*(5294), 1926–8.

[15] Spelke, E. (2003). What makes us smart? In D. Gentner & S. Goldin-Meadow (Eds.), *Advances in the Study of Language and Thought*. Cambridge, MA: MIT Press.

[16] Wellman, H. & Gelman, S. (1998). Knowledge acquisition in foundational domains. In D. Kuhn & R. S. Siegler (Eds.), *Handbook of Child Psychology*. New York: Wiley.