Modelling Human Cognition: A Singular Task

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Abstract
The cognitive literature has debated at some length the rival merits of models in which there are associationist connections and implicit rules and models in which there are explicit, syntactically structured rules. Human cognition represents a singular challenge to both models for reasons that only emerge when we undertake an analysis of the nature of human cognitive adaptation to a world in which natural and social ecology are inextricably interwoven.

It is clear that natural language has an important role in human cognition in both shaping and structuring many of the cognitive processes present in competent thinkers. Present studies in cognitive development suggest that an important part of the process is also based on the reactions and responses of adults in the child’s presence. It therefore seems that it would be helpful to examine what exactly is produced when a system of semantic and syntactic operations are mastered by a linguistically competent thinker. This investigation begins with an understanding of the nature of thought and the constraints on any good theory of human thought. I will try to make plausible the idea that such a theory gives central place to concepts and that these are marked by linguistically significant elements so that word meanings becomes a foundational feature of human thought.

I will argue that a semantic connection to the environmental conditions typically associated with the use of the work is one of two essential features of word meaning. The other feature is cognitive role whereby the connections between word meanings are partly constitutive of the way any item functions in thought. This leads to a theory of componentiality which allows for the generative or combinatorial features of human cognition and yet imbues the components with semantic properties based in interactions with the environment. These interactions are not simple and depend on the human activities occurring in that environment so that intentionality rather than extensionality is an important feature of the analysis of contributions made by the semantic components of thought.

It is here that the capacities and properties of neural network have a distinct and valuable contribution to make to our understanding of the complex nature of human thought and allow us to develop content-rich theories of cognition which accommodate both semantic relations and cognitive roles. The complex interplay between implicit and explicit rules and the spectrum of importance attaching to degrees of articulated explicitness proper to various types of rules which appear to be needed to understand the nature of human cognition allows for fruitful suggestions to be made about how the human cognitive system functions. This paper aims to lay a theoretical foundation for discussion of attempts at modelling human cognition and ways in which these might be enhanced.