

## Language's role in enabling abstract, logical thought

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**Abstract:** Carruthers's thesis is undermined on the one hand by examples of integration of output from domain-specific modules that are independent of language, and on the other hand by examples of linguistically represented thoughts that are unable to integrate different domain-specific knowledge into a coherent whole. I propose a more traditional role for language in thought as providing the basis for the cultural development and transmission of domain-general abstract knowledge and reasoning skills.

What is the role of language in thought? Carruthers claims that thought originally developed in prelinguistic hominids and other mammals within domain specific modules such as a folk biology, folk physics, or folk psychology, and that the evolution of language was necessary for integrating the outputs of these modules and so enabling humans to be more intelligent and adaptive. I take issue with the thesis on four grounds.

First, it is unclear why language should be considered *necessary* for integrating the outputs from different domain-specific modules. The evidence cited by Carruthers is very limited for such a general claim. There are clearly unfamiliar situations in which being able to use verbal coding and inner speech will make information of different kinds easier to integrate, recall, and use, but that does not provide evidence that we cannot easily integrate information from different domains *without* language in many familiar contexts. When attempting to tackle an opponent in rugby or football, or when selecting a shot to play in tennis, the athlete needs to be able to integrate psychological reasoning about the likely action about to be taken by the other player with physical information about the speed and direction in which both players and/or the ball are travelling. It is an empirical question whether inner speech might play some role here, but it seems unlikely to be necessary for integration, given that reaction times are much too quick to allow verbally mediated conscious deliberation.

Second, it is important to note (although Carruthers does not claim to the contrary) that language may often be *insufficient* to ensure integration across domains. Although we have a well-established vocabulary with which to talk about psychology and physics, the two domains stubbornly resist attempts to integrate their outputs in any known form of language, even for experts. So a psychiatrist may feel warranted to tell her patient that there is "nothing physically wrong with you," and then proceed to successfully treat the "purely psychological" symptoms with a drug known to affect physical systems in the brain. Cartesian dualism is probably the most widely held commonsense view of the mind-body relation, and the philosophical problems of integrating the output from the two forms of discourse are notorious.

The failure of language to achieve integration may also be found between folk biology and folk physics, with commonsense beliefs in animism holding for many centuries and still demonstrable in children before exposure to science education. There are also many domain effects in reasoning. Tasks of logical reasoning such as Wason's (in)famous four-card problem are very difficult in the abstract, but can be made trivially easy if placed in a domain where the structure of the domain lends meaning to the problem. If language is successful at facilitating domain-general thinking, then an account is needed of why the task (which is presented entirely in linguistic terms) should become so much harder when abstracted away from a specific domain.

Third, the thesis ignores what may be a much more crucial role for language to play in thought, namely, *abstraction* (see, e.g., the early research of Bruner et al. 1966). More recently Barsalou (1999) has developed the thesis that (broadly speaking) concepts are mental simulations. Tokening a thought with a particular conceptual content leads to (and may even just *be*) activation of sen-

sory and motor schemas associated with perception and action related to that concept. If his thesis is true, then thinking will operate most successfully within a modality-specific and situated form of mental model. I would argue that a key function of language is that it provides an escape from this primary level of thought. It provides the bridge between the "messy" prototype representation of a concept built around experience and action in the world and the "clean" representation of a concept as an encapsulated atom (see, e.g., Fodor 1998). Fodor's arguments for conceptual atomism involve the compositionality and systematicity of thought. Yet these arguments themselves are simply derived from earlier considerations of the compositionality and systematicity of language. Language allows us to abstract out a notion of a concept from the individual experiences on which it is based. It creates a new mental "entity" as a reified object of thought. As Dwight Bolinger put it, "The act of naming, with all we have seen it to imply in the way of solidifying and objectifying experience, becomes one of our most powerful suasive tools, enabling us to create entities practically out of nothing" (Bolinger 1975, p. 251).

Finally, I argue that a second crucial cognitive role for language is as a necessary precursor for the cultural development of socially shared *logical* thinking and hence, for rationality, narrowly defined. Natural language is, of course, a very imperfect tool for expressing truths of any kind because of the vagueness to be found in almost all of its referring expressions and the ambiguity in much of its syntax. However, once the reference of terms is established (e.g., by indexicals or stipulation), and care is taken in choice of syntactic form, the development of logic (and hence mathematics and science) can proceed, using forms of propositional argument based on the sentences of natural language. The formation of a community of speakers sharing the same language has therefore been essential for the progression of human thought through the formulation and the resolution of conflicting views.

In a sense, of course, abstract logical thinking performs the function of taking input from domain-specific modules and integrating them, just as Carruthers argues. But it is not the availability of language per se that lies at the basis of this integration. There are many examples of domain-specific knowledge that signally fail to be integrated in spite of fully developed language structures for talking about them. It is rather the fact that with language – and the cultural development and transmission of knowledge that it supports – comes the hard-won capacity for abstracting the form of an argument away from its content, developing general reasoning skills and finding the means for testing and challenging the reasoning of others.

## Relativistic implications of a natural-language-based format for thought

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**Abstract:** I will argue (*contra* Carruthers) that accepting natural language as the format of many of our thoughts should entail accepting a version of Whorfian relativism and that, rather than something to be avoided, evidence from bilingual cognition suggests that incorporating this idea into future research would yield further insights into the cognitive functions of natural language.

Peter Carruthers's work on the cognitive functions of language is an excellent example of the healthy symbiosis of philosophy and psychology. Carruthers's work in this area has matured in response to empirical evidence from scientific psychology (cf. Carruthers 1996, where no clear theory of central cognitive modules is presented, with Carruthers 1998 and subsequent work) and, at the same time, Carruthers has injected a philosopher's objectivity into the debate and has pointed out important new areas for research.