

Anchors not inner codes, coordination not translation (and hold the modules please)

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Abstract: Peter Carruthers correctly argues for a cognitive conception of the role of language. But such a story need not include the excess baggage of compositional inner codes, mental modules, mentalese, or translation into logical form (LF).

In this well-researched and very valuable contribution, Peter Carruthers defends a specific version of what he calls the “cognitive conception of language,” in which language plays some direct and important role in at least some aspects of human thinking and reasoning. I think the cognitive conception is correct and immensely important. But the starting points of the story are open to both conceptual and empirical challenges. A different kind of starting point may lead to an even more interesting view of language and its role in human thought.

Carruthers’s central claim is that natural language (and more specifically, the structured logical form internal representations of natural language sentences) is the medium for intermodular and non-domain-specific thinking. The structured LF representations of the language faculty provide the common format for integrating information from multiple conceptual modules, each of which might use its own form of mentalese. According to this view, thoughts are translated from mentalese into natural language representations, so that input from multiple modules can be represented in a single, integrated linguaform representation.

But suppose you are not a friend of large-scale mental modularity, and you do not believe in mentalese. Perhaps you do not even believe that the internal representations of sentences *themselves* have logical form or constitute a compositional inner code. Could you still accommodate the impressive results of Hermer-Vazquez et al. and preserve a strong cognitive conception of language?

I think the answer is yes. One possibility is to think of perceptually encountered or recalled words and sentences as acting less like inner data structures, replete with slots and apt for combinatoric action, and more like cheap ways of adding task-simplifying structure to the perceptual scene. Words and sentences, in this view, act as stable anchor points around which complex neural dynamics swirl and coalesce. Instead of thinking of linguistic encodings as enabling informational integration by acting as a common format for the outputs of multiple modules, we can think of the whole process as one not of translation into a single unifying representation but of attention-based coordination. Words and sentences here serve as kinds of simple, cheap, quasi-perceptual marker posts, enabling the agent to attend to specific dimensions of a scene, including specific combinations of aspects of the scene that would otherwise remain unnoticed.

We can also delete the modules. By all means, allow that human learning is sculpted by some innate biases, but do not suppose that the thinkings thus supported are architecturally isolated from each other. Into this nexus, learning words (such as “blue”) and phrases (such as “to the left of”) may be seen as the developmental source of new forms of selective attention. Learning the words (which now act much like cheap behavioral targets for reward and reinforcement routines) shapes the child’s attentional biases in language-specific ways that then promote new forms of problem-solving, such as the use of conjoint geometric and color cues. And certainly, there is ample evidence that children show attentional biases that appear sensitive to the language they are learning (or have learned) – for example, Bowerman and Choi (2001); Lucy and Gaskins (2001). Smith (2001) explicitly suggests that learned linguistic contexts come to “serve as cues that automatically control attention” (p. 113).

Carruthers might (again) reply that this is just to fall back on a weak conception of the role of language in which word learning

merely sculpts what is basically a nonlinguistic form of representation. Such a weak role is, he might add, undermined by the shadowing results reported by Hermer-Vazquez et al. (1999), in which linguistic activity in a distractor task impairs performance on (only) those tasks requiring integration of information across domains. But if the very process of selective attention to a complex conjoined cue required (in humans) the retrieval of at least some of the relevant lexical items, the shadowing result would also be predicted. Perhaps we need to first retrieve simple quasi-perceptual placeholders (such as words) when (and only when) a task requires us to target attentional resources on complex “unnatural,” or otherwise elusive, elements of an encountered scene. Such a picture is radically different from one in which the logical form of the natural language sentence provides the skeleton for a whole new compositional internal representation unifying the outputs of multiple modules.

Carruthers also innocently misclassifies my own view (Clark 1998) as a kind of weak, purely diachronic account in which language-independent, content-bearing structures do all the real work, and in which linguistic tokens merely serve to freeze specific contents for subsequent reencounter and further reflection. Although I do think this is an important role, it is not an exhaustive one. The presence of linguistic vehicles, I argue (in the same paper cited by Carruthers), is what makes possible the important phenomenon of “thinking about thinking” (or what I there call “second-order cognitive dynamics”). Only creatures who are able to make their thoughts into stable, attendable, scrutinizable objects, by explicitly vehicling them in some way, can then turn the apparatus of thinking onto the act of thinking itself.

Throughout, Carruthers draws a firm line between a “weak” role for language as a necessary condition for certain kinds of thought and a “strong” role for language as literally constitutive of the thoughts in question. But there is space for intermediate options. In particular, there is space for the idea that thoughts about thoughts are possible only because linguistic vehicling makes thoughts available as targets of reflection. Carruthers may say that this is again the weak diachronic story. But is it? If I think to myself, “I am not thinking straight today,” or if I think, “My opinions about language are probably all wrong,” neither of these picks out a process any *more* extended in time than, say, having the thought that grass is green. These are all individual token thoughts. Token thoughts that target other thoughts may be possible (in humans) only in virtue of the presence, at that very moment, of inner speech and rehearsal.

In sum, I think we should also consider an alternative, perception-and-attention-based picture of the role of language in thought. Such a picture is every bit as speculative as Carruthers’s own. I offer it simply as a rough-and-ready sketch of one way to pursue a strong cognitive conception without embracing the full apparatus of modules, mentalese, and compositional inner codes.

A linguistic module for integrating the senses, or a house of cards?

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Abstract: Carruthers invokes a number of controversial assumptions to support his thesis. Most are questionable and unnecessary to investigate the wider relevance of language in cognition. A number of research programs (e.g., interactionist psycholinguistics and cognitive linguistics) have for years pursued a similar thesis and provide a more empirically grounded framework for investigating language’s cognitive functions.

The wider role of language in cognition is an important and interesting question, and can be studied from many directions. In some

ways, the claim that language should be implicated in wider cognition seems almost self-evident. One is reluctant to approach Carruthers's general thesis with skepticism, because it seems intuitive that language is a kind of cognitive intersection for social, perceptual, and motor information. Indeed, to many researchers in the cognitive sciences, this is an important theoretical primary.

Contrary to Carruthers's assertions, however, many of these researchers do not endorse the purely communicative conception of language. The reason for this is simple: Many researchers do not hold that language is a distinct input-output module. In general, there is a prominent trend to reject the assumption that cognition is largely modular. Because Carruthers assumes modularity as a core premise, he alienates many who would be interested in the target article's argument and whose research efforts are very relevant to a cognitive conception of language. Carruthers appears to suspect this, and he asks the reader to hold in abeyance any sentiments against the assumption. However, there are two additional assumptive burdens that are borne by those who are willing to grant his premises: reification of thought and Chomsky's use of logical form (LF). In what follows, we discuss research that brings into question these three assumptions. Most important, this research offers a more empirically grounded approach to investigating the cognitive functions of language.

First, as a minor assumption, Carruthers invokes LF representations as a vehicle for propositional thought. He provides little justification for recruiting this framework beyond the fact that Chomsky has proposed it. In fact, to our knowledge, there has been little or no empirical work substantiating the psychological relevance of LF. Because Carruthers's thesis is supposed to be a psychological one, one would expect that a firmly established psychological framework for thought would be employed in his argument. However, there is no such framework, and even those who lean toward a more classical Chomskyan perspective on language seem to be acknowledging that such purely discrete structural representations are not psychologically plausible (e.g., Ferreira et al. 2002; Sanford & Sturt 2002).

A second assumption, closely related to the previous one, is Carruthers's claim that thoughts are discrete, semantically evaluable, and have component structure. Whether or not we deny him LF for want of experimental validation, Carruthers's general position that mental states have these overall properties should be questioned. Research using headband-mounted eye-tracking suggests that mental states are dynamic and continuous rather than discrete, and are only occasionally semantically evaluable with component structure. Eye-tracking has provided psycholinguists with behavioral data about how rapidly multimodal information is integrated in cognitive processes. For example, Tanenhaus et al. (1995) used eye-tracking to demonstrate that during spoken language comprehension syntactic ambiguity resolution, as well as word recognition, can be immediately influenced by visual context. Conversely, Spivey et al. (2001) demonstrated that linguistic information actively influences the temporal dynamics of conjunctive visual search. Both of these processes unfold very rapidly and probabilistically, and they appear to share their continuously updated partial (or underspecified) representations with one another.

This brings us to modularity, Carruthers's most controversial assumption. Within the cognitive sciences, the notion of modularity has been refined in various ways, and has gradually become, though not by any means to consensus, a neurophysiological postulate that has lost much of its strict Fodorian content. Carruthers knows this but still ends up with a "conceptual" modularity that finesses ongoing debate in the cognitive and brain sciences (e.g., Kingsbury & Finlay 2001). In short, it seems to us inappropriate to assume a mosaic of innate domain-specific modules when the verdict is still out. This firm commitment to conceptual modularity also leads Carruthers to some questionable speculation that should engender skepticism even from those who accept it. For example, he hypothesizes the existence of an abductive reasoning module, neglecting a recent argument (from the father of modern

modularity himself) that such a module is exactly what modularity cannot offer (Fodor 2000).

So how should the cognitive functions of language be studied? Carruthers fails to mention that there are active areas of research in the cognitive sciences dedicated to the cognitive, rather than purely communicative, properties of language. For example, the fast-growing approach to language, dubbed *cognitive linguistics*, takes as a central tenet that language is inherently scaffolded by the rest of perception and cognition (Tomasello 1998). Also, for almost three decades, the interactionist and connectionist approaches in psycholinguistics have aimed to establish broad integration of information in language processing (e.g., Marslen-Wilson 1975; Rumelhart 1977). Researchers in this area seek an answer to more general questions: How fluid is the interaction between language and other systems? Do they mutually influence each other in cognitive processing? In fact, the empirical data support a view that language is very much like the "cross-modular" entity that Carruthers proposes. The problem is that visual perception, audition, motor cortex, and so forth, also seem to integrate information across modalities. If these various modalities (including language) are already in the business of interacting continuously on essentially the same level, then there is no need for an exclusive linguistic switchboard function using logical form or any other format of representation.

To summarize, there are good reasons to doubt the assumptions in which Carruthers couches his version of the cognitive conception of language. The target article's ornate network of assumptions and speculation is slightly frustrating given Carruthers's hope to establish a "factual claim" and not some "modal claim arrived at by some sort of task-analysis." He seems instead to have established a quasi-factual claim arrived at by an analysis of many assumptions and scant evidence. His proposal for a more cognitive conception of language, however, is important and should be pursued. We have discussed a few lines of research engaged in this question and would welcome Carruthers to consider them as well.

Why not LF for false belief reasoning?

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Abstract: We argue that natural language has the right degree of representational richness for false belief reasoning, especially the complements under verbs of communication and belief. Language may indeed be necessary synchronically for cross-modular reasoning, but certain achievements in language seem necessary at least diachronically for explicit reasoning about false beliefs.

We could not agree more with Carruthers's central claim that language, especially syntax, allows new forms of representation and reasoning. That has been our position with regard to the development of false belief reasoning, supported empirically with both hearing four-year-olds (de Villiers & Pyers 2002) and language-delayed deaf children (de Villiers & de Villiers 2000; 2002). We argue that there is a critical property of complements in natural language; namely, they permit the representation of *false* beliefs held by another mind, and falsity is a notoriously difficult property to represent in the absence of a syntactically structured symbol system (Fodor 1975; Jackendoff 1996; Olson 1994).

With this overlap one would expect Carruthers to embrace our position with enthusiasm, but he rejects it. We are used to rejection: Linguists accuse us of being Whorfian, anthropologists accuse us of ethnocentrism, theory of mind theorists think we seized command of their module.

There are two options for false belief reasoning: Either it is propositional or it is not. We agree with Carruthers that it is. But then we can see three clear alternatives. One is that all (or most)