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## Language, consciousness, and cross-modular thought\*

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**Abstract:** Carruthers suggests that natural language, in the form of inner speech, may be the vehicle of conscious propositional thought, but argues that its fundamental cognitive role is as the medium of cross-modular thinking, both conscious and nonconscious. I argue that there is no evidence for nonconscious cross-modular thinking and that the most plausible view is that cross-modular thinking, like conscious propositional thinking, occurs only in inner speech.

In section 4 of the target article, Carruthers suggests that auditory images of natural language sentences ('inner speech') are the vehicles of conscious propositional thinking, tentatively endorsing proposals by Dennett and myself (Dennett 1991; Frankish 1998a; 1998b; forthcoming). He goes on, however, to argue that natural language has a more fundamental cognitive role as the medium of cross-modular thinking. Now, of course, the former thesis already involves a partial commitment to the latter. If conscious propositional thinking occurs in inner speech, then conscious *cross-modular* propositional thinking will do so too. However, Carruthers claims that we also entertain *nonconscious* cross-modular thoughts (sect. 5.1), which take the form of logical form (LF) representations rather than auditory images, and which are fed directly to systems that take cross-modular inputs. This claim is, I think, a more contentious one and I want to question whether there is any basis for it.

Is there any evidence for the existence of nonconscious cross-modular thinking? There is little or no *behavioural* evidence for it, I think. It is true that we are capable of performing some fairly demanding tasks nonconsciously – driving, for example, or walking down a busy street. But while these tasks may draw on outputs from more than one central module, it is doubtful that they require *integration* of them into cross-modular thoughts. The activities we can perform nonconsciously are typically routine ones, requiring precise behavioural control rather than creative thinking, and are not significantly more demanding than ones that other mammals can be trained to perform. Tasks requiring creative intelligence, however, quickly evoke conscious thought.

Rather more promising evidence for nonconscious cross-modular thinking is provided by what we may call *eureka* thoughts – episodes in which the

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\* This is an e-print of a comment on 'The cognitive functions of language' by Peter Carruthers, both published in *Behavioral and Brain Sciences* (2002) 25:6 (target article pp. 657-74, comment pp. 685-6). It may differ in minor ways from the print version.

solution to a problem pops into one's head some time after one has ceased to think about it consciously (Carruthers 2000, chap.3). Such thoughts frequently involve conjoining ideas in new ways, and it is tempting to conclude that they must be the product of nonconscious cross-modular reasoning. Of course, if Carruthers is right, such thoughts cannot be *initially framed* as a result of cross-modular reasoning, because by hypothesis they are constructed by the speech production system mechanically combining outputs from discrete central modules (sect. 6.1). But – Carruthers may say – it is likely that they have undergone nonconscious *filtering* before issuing in inner speech. Cross-modular thoughts might be routinely passed to the abductive reasoning faculty for evaluation, with only the most promising ones eventually emerging in inner speech. There is another possibility, however. This is that cross-modular thoughts are fed directly into inner speech without filtering, and that their evaluation takes place subsequently, as the agent 'hears' and reacts to them. On this view, eureka thoughts are special, not because they have been preselected for significance, but because we recognize them as important and hold on to them, whereas others are forgotten. This view is, I suggest, more consistent with the introspective data than the alternative. After all, a great deal of inner speech is simply nonsense – whims, fancies, and absurd ideas, which are instantly dismissed. Again, then, there is no compelling evidence for nonconscious cross-modular thinking – rather the opposite, in fact.

Could we elicit experimental data that would bear on the issue? What would be needed is something like a version of the Hermer and Spelke reorientation task in which subjects were distracted from thinking consciously about what they are doing. It is hard to see how this could be arranged, however. It might be suggested that we could seek the assistance of blindsighted patients – presenting them with geometric and colour information in their blind field and seeing if they could integrate it. But again is hard to see how we could test for integration of the information without stimulating the subjects to conscious thought. (Remember that blindsighted patients do not react to blind-field stimuli unless overtly prompted to do so.)

This is not conclusive, of course, and it may be that evidence for nonconscious cross-modular thinking will emerge. Even if it does, however, this would not in itself show that cross-modular thoughts can be tokened as LF representations as well as auditory images. For it may be that auditory images can themselves be nonconscious. It is plausible to think that episodes of inner speech can be *unattended*, and on some theories of consciousness this will be sufficient for them to be nonconscious. Nonconscious inner speech might nonetheless be cognitively effective – being processed by the comprehension system and made available to conceptual modules and domain-general systems.

I have argued that there is no evidence for the existence of cross-modular thinking in any form other than inner speech. I now want to outline a positive reason for thinking that it always takes that form. It is widely accepted that there is a feedback loop within the language faculty, which takes phonological representations from the speech production system and passes them to the speech comprehension system, bypassing the articulatory and auditory systems (Dennett 1991; Levelt 1989). It is this loop that supports inner speech. But if nonconscious cross-modular thinking occurs, then – assuming Carruthers is right about its language dependency – there must be additional feedback loops, which take LF representations as input and feed them back to domain-general consumer systems, such as the abductive reasoning faculty.<sup>1</sup> But why should such loops have developed in addition to the phonological one? After all, contents entering the phonological loop would also reach domain-general consumer systems via the speech comprehension system – and would *in addition* be available to other processes operating specifically on conscious thoughts (see sects. 4 and 6.3). Given this, what selectional pressure would there have been to develop additional loops channelling bare LF representations? They might have been marginally faster, but that is all. (Note that it is unlikely that such loops could have developed *before* the phonological one; both would have had to develop at much the same time, subsequent to the emergence of language.) The more economical hypothesis is surely that there is just one feedback loop from the language system – the one which carries auditory images in inner speech – and that it is the channel for both cross-modular thinking and conscious propositional thinking.

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<sup>1</sup> In fact, it is doubtful that LF representations could be channelled *directly* to an abductive reasoning faculty in the way Carruthers suggests. It seems likely that such a faculty would operate on mental models rather than propositional representations.