

# 1 Introduction: opening up options

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## 1 The basic dichotomy

What is the place of natural language in human cognition and thought? People's views on this matter have differed very markedly, dividing roughly into two opposing camps, as follows. (We shall shortly muddy these waters somewhat, by suggesting the possibility of a variety of intermediate positions. But we begin with a clean dichotomy, as an aid to the reader's vision.) On the one hand, there are those who espouse what we shall call *the communicative conception* of language, who view language as a mere adjunct to belief and thought. As the name suggests, they see the exclusive function and purpose of language to be the communication of thought, where thought itself is largely independent of the means of its transmission from mind to mind. The communicative conception is now dominant in many areas of the cognitive sciences (understood broadly to include cognitive psychology, empirical-minded philosophy of mind, linguistics, artificial intelligence – AI – and cognitive neuroscience), for reasons which we shall soon begin to explore. However, equally many historically have been committed to what we shall call *the cognitive conception* of language, which sees language as crucially implicated in human thinking. Roughly speaking, on this view, we think *in* natural language, in such a way that natural language sentences are the vehicles of our thoughts. Those espousing the cognitive conception have not claimed that language is used exclusively for thought, of course: they have allowed that it is also used in communication (they could hardly do otherwise).

In discussing the cognitive conception of language, care needs to be taken to distinguish a *requirement*-thesis from a *constitution*-thesis (which its adherents rarely do, in fact). It is one thing to say that language is *required for*, or is a *necessary condition of* thought, or certain kinds of thought (which can be fully consistent with a communicative conception of language, in fact); and it is quite another thing to claim that language itself is *constitutively involved* in those thoughts, or is the medium of those thoughts. Everyone should allow that some form of requirement-thesis has at least a

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degree of limited applicability, since it is plain that children rely upon language to acquire many of their beliefs and concepts. It seems obvious, indeed, that a languageless person could never entertain thoughts about electrons or neutrinos, genes or cell-division, for example, since it is only through language that we can learn of these things. It is quite another, and more interesting, thing to say that language remains implicated in the beliefs so acquired – in such a way, for example, that a thought about electrons can only be actively entertained by activating a representation of the word ‘electron’ (or some equivalent). Henceforward when we speak of the cognitive conception of language we should be understood to mean the constitution-thesis rather than the requirement-thesis, unless otherwise indicated.

As we shall see shortly, in recent decades many (but by no means all) of those working in the cognitive sciences have become convinced that the mind is more-or-less *modular* in structure, being made up of a number of distinct components, which are innately configured, and specialised for particular domains. (Modules can be *peripheral*, or *input and/or output*, including vision, face-recognition, audition, touch, taste, and motor control; or they can be *central*, including perhaps systems specialised for the social domain. ‘theory of mind’ – and systems dealing with naive biology, naive physics, and others. The *locus classicus* is Fodor, 1983; more recently, see Shallice, 1988; Smith and Timpli, 1995; Sperber, 1996.) Anyone influenced by this modular model is likely to regard the cognitive system which underpins language as just such a module. And then it seems almost inevitable (but not quite: see section 5 below) that they should come to endorse the communicative conception of language, coming to regard language as but an input and output module for central cognition.

The modular model of the mind has been highly influential and productive. But it has tended to eclipse the cognitive conception of language, and to marginalise work which does not fit in easily with its dominant paradigm. To that extent, the relationship between language and thought has been relatively little discussed in recent decades; since many have thought the issue to be closed. More recently, however, there are signs that the modular model of the mind is loosening its hold on a number of fronts. The chapters in this book reflect ways in which the currently popular version of the communicative conception of language and its related emphasis on innateness and modularity are being questioned. Many of them explore the middle ground between the traditional extreme views of the relationship between language and thought, and some seek to rehabilitate a cognitive conception of language in modified form.

In the sections which follow, we first give a brief historical overview of the traditional polarised views on the relationship between language and

thought – beginning with the currently less-popular cognitive conception of language, and culminating with a brief description of the modular model of the mind, and the way in which it has generated a distinctive version of the communicative conception of language. We then indicate ways in which this model is being questioned and modified, and its implications challenged: opening up the possibility for weak versions of the cognitive conception of language to be reinstated.

## 2 The cognitive conception: historical overview

In this section we survey the various forms which the cognitive conception has taken, and the manner in which it has been variously defended, from the standpoint of the disciplines of philosophy, psychology and linguistics.

### 2.1 Philosophy

The cognitive conception of language has been endorsed by such disparate philosophers as Leibniz (1704); Wittgenstein (1921, 1953); Davidson (1975, 1982); Dummett (1981, 1991); Dennett (1991); McDowell (1994); and Carruthers (1996a). While motivations have varied, one common line of argument in favour of the cognitive conception goes something like this: human beings are unique in the range and sophistication of the thoughts of which they are capable; human beings are also unique in possessing natural language; and the simplest explanation of the co-occurrence of these two unique characteristics is that it is natural language which makes distinctively human thought possible. This argument evidently has at least some force. Notice, however, that it does not support a version of the cognitive conception according to which *all* thought involves language; nor does it support the constitution-thesis over and above the requirement-thesis. Rather, it is only an argument for the much weaker idea that those of our thoughts which are distinctively human *require* language (which is, as we noted above, fully consistent with a communicative conception of language, in fact).

Many of the philosophers mentioned in the previous paragraph (specifically, Wittgenstein, Davidson, Dummett, and McDowell) have defended the cognitive conception of language in *universal* and *conceptual* terms. That is, they have claimed that it is conceptually necessary that *all* thought should involve language – claiming that the very idea of thought implicates language. So animals and young infants lack thoughts altogether, and it is supposed to be logically impossible for a languageless creature to have propositional attitudes at all, let alone to have sophisticated beliefs and desires like ours. The arguments for this view are basically epistemological.

(One form of it goes like this (see Davidson, 1982). Propositional attitudes have finely discriminated contents: for example, the thought *that Venus has set* is distinct from the thought *that the evening star has set*, even though Venus and the evening star are one and the same. But nothing except linguistic activity (for example, *asserting*, 'Venus has set' while *denying*, 'The evening star has set') could manifest, or establish, that a creature entertains the first of the above thoughts *as opposed to* the second. So only a language-using creature can *have* such a thought.

This argument depends, however, upon an objectionable verificationism, or anti-realism, about mental states. For without assuming some such view as a suppressed premise, it simply does not follow from the fact that we cannot *know* what, precisely, a creature is thinking, that it is *not* thinking anything. And if, on the contrary, thoughts have a reality which is distinct from, and independent of, our modes for evidence of them, then it is perfectly possible that non-language-using creatures may have fully determinate thoughts, but thoughts which we cannot have knowledge of. And the evidence is, surely, that this is the case. The evidence from ethology strongly suggests that animals are capable of a variety of kinds of thought and reasoning, even if we cannot know precisely *which* finely discriminated thoughts they entertain on any given occasion (Walker, 1983; Griffin, 1984; Byrne and Whiten, 1988; Allen and Bekoff, 1997). The same is true for the evidence from child development (Carey, 1985; Flavell, 1985; Sperber *et al.*, 1995). So if any form of cognitive conception of language is to stand a chance of being accepted by cognitive scientists, it needs to be weaker than the sort of universal conceptual thesis defended by some philosophers.

## 2.2 Psychology

Amongst psychologists, the strongest proponents of a cognitive conception of language were a group of Russian psychologists led by Sokolov (1972), who maintained that 'inner speech' was involved in many, though not all, aspects of thinking, including solving standard tests of non-verbal ability, and reproducing pictorial material. Sokolov and others sought to demonstrate this experimentally using speech-interference techniques and electro-myographic measurements of sub-vocal speech activity, with some degree of success. Another well-known Russian psychologist, Luria (1959) described inner speech as 'the second signalling system', and demonstrated its role in the conscious control of motor action, in addition to its role in more intellectual forms of thought. For example, he showed that children with language were able to inhibit a reaching response in a situation in which not-reaching was rewarded, whereas children without language were unable to inhibit the response.

In another study, Luria and Yudovich (1956) took a pair of five-year-old twins who had, through neglect and lack of motivation resulting from the self-sufficiency of the 'twin situation', acquired barely any language. They separated the twins and placed them in environments where they would have the motivation to learn to communicate, and, in addition, subjected just one of them to a course of language-training. They reported marked improvements in cognitive ability with the beginnings of acquisition of language after just three months. When first discovered, the twins appeared incapable of even rudimentary forms of play. They would move objects about and line them up, for example, but would make no attempts at construction or planning, let alone at symbolic play. They also appeared incapable of classifying heterogeneous collections of objects into kinds. But as their language improved, so their play became more ordered, thoughtful, and creative, and similarly their classification abilities became more normal. (And these improvements were considerably more marked in the case of the language-trained twin.)

Although the methodology of these early studies can be questioned, they are extremely suggestive for the thesis that some kinds of thinking actually involve natural language. Moreover, recent work in Diaz and Berk (1992) confirms Luria's early claims concerning the role of language in the control of motor action. Apart from the Russian group, other psychologists working around the middle of the century tended to favour a related set of views, including the view that language is learned using domain-general cognitive resources, and especially associative learning (Skinner, 1957); that the brain is not innately highly specialised but has, rather, a high degree of plasticity (Lashley, 1950); and that adult language and thought share a common symbolic basis (Goldstein, 1948; see Varley, this volume chapter 6, for a fuller account of the debate in aphasiology of which Goldstein's views formed a part).

Nevertheless, even psychologists who are strongly committed to the cognitive conception of language have always stopped short of arguing that languageless thought is impossible. Visual and other forms of imagistic thinking are always excepted, even if only for certain individuals, and no psychologist would wish to deny that pre-linguistic children have concepts, memories, and expectations which constitute at least some form of primitive thought. Vygotsky (1934), for example, who argued strongly for the involvement of language in thought, argued equally strongly that language and thought have different and independent roots, and different modes of operation in the pre-linguistic child. In this more guarded commitment to a cognitive conception of language, psychologists therefore differ from philosophers such as McDowell (1994), who claim that languageless thought is impossible.

### 2.3 Linguistics

The most radical and best-known form of the cognitive conception of language does not, however, come either from philosophers or from psychologists, but from a linguist, Benjamin Lee Whorf (1956). According to Whorf's linguistic relativity hypothesis, human concepts and ways of thinking, and indeed much of the very structure of the human mind itself, are acquired by young children from adults when they learn their native language and become inducted into the surrounding culture; these concepts and structures differing widely, depending upon the structures and conceptual resources of the natural languages in question. This mind-structuring and social-relativist view of language is still dominant in the social sciences: indeed Pinker (1994) refers to it disparagingly as the 'Standard Social Science Model'.

The line of thinking behind the Standard Social Science Model goes something like this: we find wide variations in behaviours and social structures between different cultures, and equally wide variations amongst languages; yet these variations are not genetic – children born of one culture but brought up in another will of course develop the behaviours and practices of a native; so the natural explanation is then that the mind is initially a more or less blank slate, just as traditional empiricism supposed; and that all the structure imposed upon it comes from the particular language the person acquires, and from the particular culture they find themselves immersed in. For further development, and extended criticism, of this line of thought, see Malotki (1983); Pullum (1991); Tooby and Cosmides (1992); and Pinker (1994).

### 3 The communicative conception: historical overview

In this section we survey the forms taken by, and the defences offered of, the communicative conception, again in connection with the three disciplines of philosophy, psychology and linguistics.

#### 3.1 Philosophy

The communicative conception of language has also been popular amongst philosophers, having been endorsed by such varied thinkers as Locke (1690); Russell (1921); Grice (1957, 1969); Lewis (1969); Fodor (1978); and Searle (1983). According to these philosophers, the function and purpose of language is to facilitate communication, rather than to be involved in thinking (except indirectly, of course, by enabling the acquisition of new beliefs from other people). Language thus functions wholly in the public, inter-per-

sonal, domain, rather than in the domain of individual cognition. Language will still have to be represented and processed within the cognition of each individual, of course. But such processing will exist only to support the public functions of language, rather than having any direct executive role in the thinking and practical reasoning of the individual subject.

The attractions of the communicative conception of language to philosophers have been manifold. In the first place it may be argued that language is plainly used for purposes of communication; and it is equally obvious that *some* forms of thinking, particularly where visual imagery is involved, are independent of language. So considerations of simplicity then suggest that *all* thought may be independent of language, and hence that language may be for purposes of communication only. This argument on its own is weak, of course, since it would require only minimal contrary evidence to overturn a bare appeal to simplicity of this sort.

A second argument is semantic, and comes in two different forms. In its historical, empiricist, version (e.g. Locke, 1690; Russell, 1921) it goes like this. We need to give an account of how anything (be it language, thought, or whatever) can *mean* or *represent* anything else; in the case of visual (and other) imagery, it is (supposedly) *transparent* how representation takes place – namely, via resemblance; yet it is not at all obvious how language, in itself, could represent anything (let alone via resemblance); so we get a satisfying explanation if we say that the representative powers of language are derivative from the representative powers of thought (mental images), and if we say that the function of language is merely to signal thoughts from one mind to another.

This classical argument for the communicative conception collapses, however, since the imagist theory of thought is hopelessly inadequate as an account of all forms of thinking – or, indeed, as an account of *any* of our propositional thoughts. (Try expressing such concepts as *not*, *and*, *or*, *cause*, *tomorrow*, *sixty-four*, and so on, in the form of a visual or other image; or even such a simple proposition as *grass is green!*) But descendants of the argument survive on, in the work of Grice and his followers (Grice, 1957, 1969; Lewis, 1969; Searle, 1983). The idea is still that we can explain the semantic properties of language in terms of the semantic properties of thoughts. We can say, for example, that for an utterance to mean *that P* is for the speaker to intend (a) that the utterance should cause the hearer to come to believe *that P*, through (b) the hearer's recognition of the speaker's intention to do just that. (Many variations and refinements of this proposal exist in what is now an extensive literature: for further discussion, and a critique, see Laurence, 1996, and this volume chapter 10.) And the claim can be that we *should* seek such an explanation, since thought-content is plainly more basic, and more primitive, than linguistic meaning (Searle, 1983).

### 3.2 *Psychology*

The communicative conception of language and its loosely associated themes of innate mental endowments and modularity are prefigured in the work of the 'faculty psychologists' such as Gall in the early nineteenth century. In the late nineteenth century, the claim that particular abilities, and pre-eminently language, were located in particular areas of the brain where they functioned relatively independently of other abilities received some support from the work of neuropsychologists and neurosurgeons such as Broca, who demonstrated that the ability to speak is dependent on a particular area of the brain now known as Broca's area. Once psychology proper had been established, the notion of relatively discrete 'special abilities', including the distinction between verbal and non-verbal abilities, resurfaced in the work of psychologists such as Spearman (1927), whose main aim was to develop intelligence tests. The notion of special, discrete abilities, including a distinct linguistic intelligence, is currently powerfully represented in Gardner's theory of multiple intelligences (Gardner, 1983). Implicit in the notion of special abilities is an assumption that language develops at least partly independently of other types of cognitive ability, and is not involved in all types of thinking. However, it would seem that an extreme form of the communicative conception of language has never been accepted within scientific psychology, any more than a strong form of the cognitive conception has been argued for (see above). The involvement of language in conscious thought, or what psychologists call 'natural language mediation' (NLM), was first systematically researched and documented by Reed (1918), and has since then been extensively researched by others. There is no dispute amongst psychologists concerning the fact that NLM is used by all linguistically competent children and adults in their learning and memory, planning, and problem solving, although there is some dispute about some details of its use (Pavio, 1971, chapter 9; Atkinson *et al.*, 1990, pp. 306–11). Those psychologists who argue that language is a discrete ability predominantly subserving communication nevertheless accept, therefore, that language may be used reflexively to facilitate thought. Even Piaget (1932) who considered that language is used mainly for socialisation allowed that language also serves to assist in the formation and re-organisation of thought structures.

Here it is important to distinguish, however, between the claim that language is itself the *medium* for some thoughts and is partly constitutive of those thoughts (which is a weak form of the cognitive conception), and the claim that language *facilitates* or *augments* some forms of thought. This latter is best seen as a version of the communicative conception of language, in fact (important enough for us to label it the *supra-communicative conception* – see section 5.2 below for discussion), rather than a form of the cog-

nitive conception at all. Once this distinction is drawn, it then becomes unclear quite which of the two doctrines the psychologists mentioned above intended themselves to be committed to.

### 3.3 *Linguistics*

The most radical and best-known argument for the communicative conception of language came, as in the case of arguments for a cognitive conception of language, not from philosophers, nor from psychologists, but from a linguist, in this case Noam Chomsky. In his early work on transformational grammar, Chomsky (1957) argued that thought had to be translated into language in the process of linguistic expression, and translated out of language into a 'language of thought' in the process of linguistic comprehension. Although Chomsky subsequently abandoned the notion of transformational grammar, his view of language as separate from thought has persisted and been highly influential (Fodor, 1975, 1983; Levelt, 1989; Pinker, 1994). In addition, and related to his argument that language is an independent system, Chomsky has from the late 1950s and 1960s argued that the best explanation of linguistic universals (abstract features of grammar found to be common to all natural languages) is that humans possess an innately structured language faculty, and that poverty of the stimulus and learnability arguments imply that children's acquisition of natural language is best thought of in maturational terms, rather than in terms of learning (see Chomsky, 1988, for a review). Chomsky's views on the relationship between language and thought are therefore consistent with, and indeed have contributed substantially to, the modularist and nativist view of the mind.

## 4 **The modularist model**

Chomsky's radical version of the communicative conception of language was first articulated at much the same time as progress in neuroscience and advances in what was then called artificial intelligence were increasingly persuading workers in various disciplines that the mind is more or less modular in structure, built up out of isolable, and partly isolated, components. Chomsky himself used the expression 'faculty' to describe the self-contained system which, he believes, subserves language. Fodor (1983) introduced, or at least popularised, the term 'module', and established criteria for what constitutes a module. He argued that peripheral input and output systems are modules, and that such modules subserve each of the various senses, motor action, and also language. He further argued that the central system where thought is processed is not a module, nor open to systematic empirical investigation, and introduced the term 'Mentalese' to

identify what others have called the (non-natural-linguistic) 'language of thought'.

The Chomskian–Fodorian view of the mind, including their views on the relationship between language and thought, have constituted the dominant model in many of the cognitive sciences over the last three decades or so. Aspects of the model have continued to receive empirical support. Neuroscience and the study of disorders have, for example, produced considerable evidence for the existence of highly specialised, dissociable systems and sub-systems within the brain (Lenneburg, 1967; Shallice, 1988). Developmental psychologists have demonstrated that the new-born infant is by no means the *tabula rasa* which was once suggested, and that knowledge of the object world, of people, and of language is, if not innately present, then innately constrained in ways which makes development highly predictable and universal under normal conditions (see Karmiloff-Smith, 1992, and Spertber *et al.*, 1995, for reviews).

The modular model has also been productive at a theoretical level. It has, for example, made the Gricean arguments for the communicative conception of language attractive to many researchers, who have thus come to accept that conception through something like the philosopher's route. It has also formed the basis of the much-discussed hypothesis that social cognition is subserved by a social cognition module, or 'theory of mind (TOM) mechanism' (Leslie, 1987, 1994; Baron-Cohen, 1995; Carruthers and Smith, 1996). The hypothesis concerning the existence of a social cognition, or theory of mind, module is paralleled by Brothers' work in neuroscience (Brothers, 1990). The hypothesis also builds on findings in primatology that apes seem to have a simple, perhaps largely implicit, version of this system (Byrne, 1995; Gomez, 1996a and this volume chapter 4), and with the view that the driving force behind the evolution of human intelligence may have been the demands, and benefits, of social understanding and social manipulation (Humphrey, 1986; Byrne and Whiten, 1988). This has made it natural to think that the basis of language lay in *intentions to communicate*, just as Grice supposed, and that the primary (perhaps only) function of language is communication.

According to this strong form of the communicative conception, then, language is essentially just an input/output device for central cognition. The natural language system is held to be a mere conduit through which thoughts are transmitted into, and out from, central cognitive processes of believing, thinking and reasoning, without itself actually being implicated in the latter activities. (Of course, everyone allows that language is *important* for cognition, since a vast proportion of normal adult beliefs and concepts can only be acquired from others, through linguistic communication. This is not at issue. Recall our distinction between the claim that language

is *required* for certain forms of thought – which is almost certainly true, but is consistent with the communicative conception of language – and the claim that language is *involved* in or *partly constitutive* of those forms of thinking.) So on this view, if we lacked natural language then we might end up believing, and hence thinking, a good deal less than we do. And our lives might be a great deal lonelier. But our thought processes, and our basic intellectual capacities, would otherwise remain essentially unchanged.

## 5 Weakening the dichotomy

In recent years, the dominance of a strong version of the communicative conception of language within the cognitive sciences, with its related emphasis on modularity and innate knowledge, has begun to weaken. One important factor, here, has been the advent of connectionism, and the ability to model human learning and behaviour using parallel distributed processing in connectionist networks. Connectionism has, over the last ten to fifteen years, brought computer simulations of behaviour and brain function closer to biological reality than was previously possible. It has also opened up the possibility that the human brain can learn more, and be innately endowed with less, than has generally seemed likely over the past few decades. This in turn may suggest that the brain may have greater plasticity than has generally been thought in recent years, and be less rigidly divided into pre-specified modules (at least in early infancy) than was previously thought to be the case (Elman *et al.*, 1996). And that then suggests a less rigid division between thought and language, and clears the way for some form of the cognitive conception of language to replace the current standard model.

Furthermore, one factor which has contributed to most cognitive scientists accepting the currently dominant version of the communicative conception of language, we believe, has been a mere failure to distinguish the cognitive conception of language from the Whorfan linguistic relativity hypothesis, or what Pinker disrespectfully refers to as the 'Standard Social Science Model' (see section 2.3 above). Most researchers have assumed that if they were to accept any form of cognitive conception of language, then that would commit them to Whorfan linguistic relativism and radical empiricism, and would hence be inconsistent with what they take to be their well-founded beliefs in modularity and nativism. But this may well be a mistake. Someone endorsing the cognitive conception of language may not *have* to regard language and the mind as cultural constructs, either socially determined or culturally relative. In fact, the cognitive conception of language can equally well be deployed along with a modularist and nativist view of language and mind – or so, at any rate, one of us will later argue (Carruthers, this volume chapter 5; see also Carruthers, 1996a).

Another factor which has led to the premature dismissal of the cognitive conception of language by most cognitive scientists, has been that they have had in mind the most extreme forms of such a view, of the sort espoused by Wittgenstein and Davidson, for example. As we noted above, on such accounts language is held to be necessary for any thought whatever, and most animals can therefore be characterised as thoughtless brutes. Indeed, many in the Wittgensteinian tradition (such as McDowell, 1994) maintain that possession of a language is *sufficient* for all forms of thought, claiming that training in a natural language is what confers on us our status as rational agents. Believing, rightly in our view, that these extreme positions are highly implausible, many cognitive scientists have again felt warranted in rejecting the cognitive conception of language *tout court*. For in the light of our knowledge of animal behaviour and infant development, and also given the way in which cognitive abilities can be spared in global aphasia, it seems most unlikely that language should be necessary for all forms of thought. And given the way in which language can be spared in people whose cognitive deficits are otherwise very severe (such as Williams syndrome, and various forms of dementia), it seems unlikely that language mastery *confers* a capacity for all kinds of thinking, either (see Boucher, this volume chapter 3).

Yet the cognitive conception of language need not involve any commitment to extreme claims of these sorts. First, it need only maintain that language is involved in (and is partly constitutive of) *some* kinds of thinking. It can thus allow that spatial reasoning, for example, can be conducted independently of language, while claiming that many other types of reasoning – such as reasoning about unseen causes, thinking about the thoughts of another person, or reasoning about which train to catch to be in London for a 3 pm appointment – are crucially conducted in language. Second, the cognitive conception can perfectly well maintain that language is but one component of (some of) our reasoning systems, thus allowing for cases – such as Williams syndrome – where language is spared but (some forms of) reasoning disrupted.

### 5.1 *Weakening the cognitive conception*

As has already begun to emerge, the cognitive conception of language can be weakened (and rendered more plausible) in at least two distinct directions. First, all claims to the conceptual, or logical, involvement of language in thought can be dropped. Rather, it can be claimed that language is implicated in (some or all) thought as a matter of actual fact, or as a matter of *natural* necessity (resulting, perhaps, from the structure of human cognition). Amongst recent writers, Bickerton (1990, 1995), Dennett (1991), and Carruthers (1996a) have all defended views of this general sort – though

considerable differences remain between them. Roughly, Dennett espouses a form of Whorffianism, maintaining that the human mind results once the parallel architectures of the brain have been re-programmed as a result of human beings acquiring language, and as a consequence of the new ideas and ways of thinking which language brings. Carruthers, on the other hand, develops a version of cognitive conception which is broadly nativist and modularist (see also this volume chapter 5), while Bickerton's view is nativist but *not* modularist. According to Bickerton, the human mind resulted when the brain was radically re-structured by the evolution of grammatical competence, which is held to coincide with the powers of thought available to central cognition.

The second direction in which the cognitive conception of language can be weakened, and thereby rendered more plausible, is by dropping any claims to universality. While allowing that some thoughts (particularly visuo-spatial thoughts, and the thoughts available to animals and infants) are independent of language, it can nevertheless be claimed that other thoughts crucially implicate language. This then requires us to mark a division amongst thoughts, between those which involve language and those which do not. There are roughly two ways in which this can be done. Either one can mark the division *horizontally*, in terms of types of content; or one can mark the division *vertically*, in terms of the modes in which those contents are entertained (or both). The first of these strategies is pursued by Gomez, Carruthers, and Segal (this volume, chapters 4, 5, and 7), who explore the idea that thoughts about mental states, in particular, might crucially involve natural language. The second strategy is pursued by Carruthers, Davies, Franksish, Perner, and Dennett (this volume chapters 5, 11, 12, 13, and 14), who discuss the idea that natural language may only be implicated in certain *levels* of thought – perhaps conscious as opposed to non-conscious (Carruthers, Davies, Dennett), perhaps actively as opposed to passively, formed (Franksish), or perhaps explicit as opposed to implicit (Perner).

The Whorffian hypothesis, too, admits of a weaker reading. Even if the extreme empiricism of the Standard Social Science Model is rejected, there remains the possibility that differences of a conceptual and grammatical sort between different natural languages might influence the *perceptions* of those brought up to speak those languages. Indeed, there is mounting evidence that this is in fact the case (Lucy, 1992a, 1992b; Goldstone, 1994; see also Goldin-Meadow and Zheng, this volume chapter 2). Such a view is relatively weak, however, since consistently with it, we can allow that the *thoughts* and *thought-processes* of all human beings remain fundamentally the same (though whether this is because of the universal structures present in all natural languages, as the cognitive conception of language would maintain, can be left open).

5.2 *Weakening the communicative conception*

It is also possible to soften the edges of the communicative conception somewhat, without altering its fundamentals. Thus Clark (this volume chapter 8) argues for a conception of language as a cognitive tool. The idea is that language gets used, not just for communication, but also to augment human cognitive powers. Thus by writing an idea down, for example, I can off-load the demands on memory, presenting myself with an object of further leisured reflection. We shall label this view (following Clark's suggestion) *the supra-communicative conception of language*.

The main difference between the supra-communicative and cognitive conceptions of language, should *not* be expressed by saying that for the former, sentence-tokens serve to augment but do not constitute thought, whereas for the latter the sentence-token *is* the thought. For no one should want to claim that a tokened natural language sentence *is* (or is sufficient for) a thought. (Consider a monolingual speaker of Russian uttering a sentence of English, for example.) Indeed, defenders of the cognitive conception, too, should accept that the content of an inner tokened sentence will depend upon a host of more basic connections and sub-personal processes. Rather, the claim is that the sentence is a *necessary component* of the thought, and that (certain types of) reasoning necessarily involve such sentences.

The difference between the two views can be put as follows. According to the cognitive conception, a particular tokening of an inner sentence is (sometimes) an inseparable part of the mental episode which carries the content of the token thought in question; so there is no neural or mental event at the time which can exist distinct from that sentence, and which carries the relevant content; and so language is constitutively involved in (certain types of) cognition, even when our focus is on token thinkings. For the supra-communicative account, however, the involvement of language only arises when we engage in an extended *process* of thinking or reasoning over time. So far as any given token thought goes, the supra-communicative account can (and does) buy into the communicative conception of language. It can maintain that there is a neural episode which carries the content of the thought in question, where an episode of that type can exist in the absence of any natural language sentence, but which in the case in question causes the production of a natural language representation. This can then have further benefits for the system of the sort Clark explores (for example, off-loading memory demands).

Clark's supra-communicative account can provide quite a convincing explanation for the use of language (especially written language) in solitary, as when one writes notes to oneself, or performs a calculation on a

piece of paper. It is less obvious what account he can give of *inner* speech. Since there is here no medium of representation outside the mind, Clark certainly cannot say that the function of inner speech is to off-load the demands on memory. What he can perhaps say, however (and this is what Varley *does* say, this volume chapter 6), is that inner speech serves to *enhance* memory. For it is now well-established that the powers of human memory systems can be greatly extended by *association* (Baddeley, 1988). If asked to memorise a list of items, for example, it will be more efficient to associate them with something else, rather than simply repeating the names to yourself (even repeating them many times over). Thus, you might imagine walking around the rooms of your house, placing a distinct item in each room. This then gives you an independent fix on those items in memory – you can either recall them directly, or you can recall the rooms, from which you might extract the associated item.

Something similar might very well take place in the case of inner verbalisation. By translating an underlying (non-natural-language) thought into its imaged natural language equivalent, we might get an independent fix on that thought in memory, so making it more likely that it will be available to enter into our reasoning processes as and when the need arises. This might then greatly enhance the range and complexity of the thoughts and sequences of reasoning which are available to us. While this memory-enhancement proposal may not necessarily provide the *best* explanation of inner speech (see Carruthers, 1996a, chs. 6 and 8), it is certainly a possible one.

6 **The time is now ripe . . .**

As should already be clear from the foregoing, we believe that the time is now ripe for investigators from a variety of disciplines to return to the issue of the relations between language and thought; and we hope that this volume may prove seminal in this respect. For it is striking how little recent work bears directly on the dispute between the cognitive and communicative conceptions of language, at least in their weaker and more fragmentary guises. Where cognitive scientists have addressed the issues at all, they have tended to focus on the cognitive conception in its Whorfan and all-thought-encompassing guises, and so have produced little which is relevant to more modest proposals. (For example, most of the contributors to Weiskrantz, 1988, saw their role as opposing an extreme Wittgensteinian position on the place of language in cognition.) Moreover, where scientists have gone to potentially fertile sources of evidence – such as Genie, who was kept isolated and languageless to the age of 13 (Curtiss, 1977), or deaf children who have not had exposure to conventional sign-languages

(Goldin-Meadow and Mylander, 1990) – they have tended to concentrate on matters rendered more fashionable by the dominant modular model, such as the evidence for critical learning periods in language acquisition.

As indicated above, the modularist, strongly nativist, model is now under threat from without, in the guise of connectionism. And it is also, not under threat, but subject to various forms of modification from within. These changing paradigms and shifting emphases open up new possibilities, and may make old questions seem more pertinent. What is needed now, and what the essays in this volume begin to provide, is a re-examination of the language-and-thought issue from both theoretical and empirical perspectives – both proposing possibilities not previously considered and distinguishing cases frequently lumped together, and also bringing to bear today's more fine-grained experimental techniques (including an increasing battery of non-verbal tasks of various sorts) in testing them.

What we do want to emphasise again here, however, are two distinctions which potential experimenters should be mindful of. One is the distinction Karmiloff-Smith draws (1992) between representations which are *implicit*, perhaps being embedded in some practical procedure, and those which are *explicit*, available for general use in cognition and for interactions with centrally stored information outside of any particular domain. In investigations of the cognitive abilities of people suffering from aphasia or other language disabilities, for example, we need to be careful to ensure that what is being displayed is genuinely *thought* about the cognitive domain in question, and not merely some sort of discrimination of, or sensitivity to it.

The second important distinction is between uses of language to *enhance* cognition (of the sort outlined in section 5.2 above, in our discussion of the supra-communicative views of Clark and Varley), and uses of language which are partly *constitutive* of thought in some cognitive domain. These two possibilities may not prove easy to discriminate experimentally. Suppose, for example, that one were to investigate the cognition of pre-conventional-language deaf children (Goldin-Meadow and Mylander, 1990; Goldin-Meadow and Zheng, this volume chapter 2), studying the changes which take place when they acquire a conventional sign-language like ASL (very fast) at the age of six or seven. say. (This would, in effect, be a re-run of the Luria and Yndovich 1956 twin-experiment.) And suppose that what was found was some marked improvement in particular cognitive domains – in theory of mind, as it might be. This would not yet speak in favour of a limited form of) the cognitive conception of language, as opposed to the supra-communicative conception of language as a tool. What would in fact be needed, are tests of the sophistication of the children's thinking in the cognitive domains in question, but ones which do *not* place significant demands on memory. These may not prove easy to devise.