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Thought and language

So far in this book, we have discussed various different kinds of mental state, including sensations, perceptions (that is, perceptual experiences) and beliefs. We discussed beliefs (and other propositional attitude states) in quite some detail in chapters 3 and 4, before going on to talk about sensations and perceptions in chapters 5 and 6. This order of discussion – although consistent with the overall plan of the book – might strike some readers as being an inversion of the natural one, because it is natural to assume that sensations and perceptions are, in more than one sense, 'prior' to beliefs. They seem prior to beliefs, first of all, in the sense that many of our beliefs are *based on*, or *derived from*, our sensations and perceptions, whereas the reverse never seems to be the case (except, perhaps, in certain species of delusion). Secondly, sensations and perceptions seem prior to beliefs in the sense that, whereas we might be willing to attribute sensations and perhaps even perceptions to a creature which we deemed incapable of possessing beliefs, I think we would – or, at least, *should* – be less willing, and perhaps altogether unwilling, to attribute beliefs to a creature which we deemed incapable of possessing sensations and perceptions.

Part of what is implied here is that beliefs are mental states of *a higher cognitive level* than are either sensations or perceptions. One might wish to deny, indeed, that sensations are 'cognitive' states at all – although against this one could urge that sensations provide a creature with information about the physical condition of various parts of its body and its immediate environment (for example, that sensations of

pain inform it about damage to certain of its body-parts and that sensations of smell inform it about the presence of food or other animals). *Perceptions*, on the other hand, clearly qualify as 'cognitive' states, if – as was urged in chapter 6 – we should think of them as necessarily possessing conceptual content: for an ability to exercise concepts is undoubtedly a cognitive ability. The adjective 'cognitive' derives from the Latin verb *cognoscere*, meaning 'to know', and knowledge properly so-called is inextricably bound up with an ability to exercise concepts. However, this very connection between cognition and concept-possession should make us reconsider whether the kind of information made available to a creature by its sensations suffices to justify our describing sensations as 'cognitive' states. Arguably, it does *not* suffice, since no exercise of concepts on the part of the creature need be involved. A dog which licks its wounded leg, upon feeling a sensation of pain there, is clearly in some sense responding to information made available to it about the physical condition of its leg. But in order to respond appropriately in this way, the dog does not apparently need to exercise *concepts* of any sort. It need, in particular, possess no concept of a *leg*, nor of *damage*, nor of *itself*, nor indeed of *pain*.

Having made this connection between cognition and concept-possession, however, we may begin to feel dissatisfied with some aspects of the discussion about beliefs and their 'propositional content' in chapter 4. In particular, we may feel that beliefs were there treated merely as 'representational' or 'informational' states, in a way which was quite insensitive to the distinction between those mental states which do, and those which do not, presuppose an ability to exercise concepts on the part of creatures possessing the states in question. That is one very important reason why we must now return to the topic of belief and, more broadly, to the topic of *thought*. Our preliminary investigations into this area in chapters 3 and 4 were not in vain, inconclusive though they were. Now we are in a position to carry them further forward in the light of what we have learnt about sensation and perception. For one thing which we must try

to understand is how sensation and perception are related to thought and belief. Another is how thought and belief are related to their expression in *language*.

Some of the questions that we shall address in this chapter are the following. Is all thought symbolic and quasi-linguistic in character? Is there a 'brain code' or 'language of thought'? What is the role of mental imagery in our thinking processes? How far is a capacity for thought dependent upon an ability to communicate in a public language? Does the language which we speak shape or constrain the thoughts that we are capable of entertaining? And to what extent are our capacities for language innate?

MODES OF MENTAL REPRESENTATION

Let us begin with the seemingly innocuous proposition that cognitive states, including thoughts and beliefs, are at once *mental* states and *representational* states. Now, I have already suggested that talk of 'representation' in this context is somewhat indiscriminate, in that it is insensitive to the distinction between conceptual and non-conceptual content (recall our discussion of this point in the previous chapter). However, precisely for this reason, such talk carries with it a smaller burden of assumptions than would more specific ways of talking, which gives it certain advantages. The questions we need to think about now are (1) *how* mental states could be representational states and (2) what *modes* of representation they must involve in order to qualify as cognitive states. It is in addressing the latter question that we can impose the constraint that cognitive states must be seen as possessing some kind of conceptual content.

We have already given the first question a good deal of consideration in chapter 4, where we explored various naturalistic accounts of mental representation (although, to be sure, we found reason to be less than fully satisfied with these). So let us now concentrate on the second question. Here we may be helped by reflecting on the many different modes of *non*-mental representation with which we are all

familiar. The wide variety of these modes is illustrated by the very different ways in which items of the following kinds serve to *represent* things or states of affairs: pictures, photographs, diagrams, maps, symbols, and sentences. All of these familiar items are, of course, human artefacts, which people have designed quite specifically in order to represent something or other. Indeed, it is arguable that every such artefact succeeds in representing something only insofar as someone – either its creator or its user – *interprets* it as representing something. If that is so, we might seem to be faced with a difficulty if we tried to use such items as models for understanding modes of *mental* representation. For – quite apart from its inherent implausibility – it would surely involve either a vicious circle or a vicious infinite regress to say that *mental* representations succeed in representing something only insofar as someone interprets them as representing something. For *interpreting* is itself a representational mental state (in fact, a kind of cognitive state). One way of putting this point is to say that human artefactual representations, such as pictures and maps, have only 'derived', not 'original', *intentionality* – intentionality being that property which a thing has if it represents, and thus is 'about', something else (in the way in which a map can be 'about' a piece of terrain or a diagram can be 'about' the structure of a machine).[1]

We may respond to the foregoing difficulty in the following way. First of all, the fact (if it is a fact) that artefactual representations have only derived intentionality, while it might prevent us from appealing to them in order to explain *how* mental representations can be representational states – which was question (1) above – would not prevent us from appealing to them for the purposes of answering question (2), that is, as providing models of various different possible

[1] For discussion of the distinction between 'original' (or 'intrinsic') intentionality and 'derived' intentionality, see John R. Searle, *The Rediscovery of the Mind* (Cambridge, MA: MIT Press, 1992), pp. 78–82. For more about the notion of intentionality quite generally, see his *Intentionality: An Essay in the Philosophy of Mind* (Cambridge: Cambridge University Press, 1983).

modes of mental representation. It could be, for example, that certain modes of mental representation are profitably thought of as being analogous to *sentences*, as far as their form or structure is concerned. Certainly, it would be unpromising to maintain that such a mental 'sentence' serves to represent something – some state of affairs – for the same sort of reason that a written sentence of English does, since it seems clear that sentences of English only manage to represent anything in virtue of the fact that English speakers *interpret* them as doing so. Hence, we must look elsewhere for an account of *how* a mental 'sentence' could manage to represent anything (appealing, perhaps, to one of the naturalistic accounts sketched in chapter 4). However, it might still be the case that there is something about the *structure* of natural language sentences which makes them a promising model for certain modes of mental representation. This is the issue that we shall look into next.

THE 'LANGUAGE OF THOUGHT' HYPOTHESIS

The following line of argument provides one reason for supposing that cognitive states, including thoughts and beliefs, must be conceived of as involving some sort of quasi-linguistic mode of representation. We have already made the point that cognitive states have *conceptual* content. But, more than that, they have conceptual *structure*. Compare the following beliefs: the belief that horses like apples, the belief that horses like carrots, the belief that squirrels like carrots and the belief that squirrels like nuts. Each of these beliefs shares one or more conceptual components with the others, but they all have the same overall conceptual structure – they are all beliefs of the form: *F*s like *G*s. Now, sentences of a language · are admirably suited to capturing such structure, because they are formed from words which can be recombined in various ways to generate new sentences with the same or different structure. The grammatical or syntactical rules of a language determine what forms of combination are admissible. A competent speaker, who has an implicit knowledge of those

rules together with a large enough vocabulary – which may, however, comprise only a few thousand words – can construct a vast number of different sentences, many of which he may never have encountered before, in order to express any of a vast range of thoughts that may come into his head. The *productivity* of language, then – its capacity to generate an indefinitely large number of sentences from a limited vocabulary – seems to match the productivity of thought, which suggests a close connection between the two. A plausible hypothesis is that the productivity of thought is explicable in the same way as that of language, namely, that it arises from the fact that thought involves a structural or compositional mode of representation analogous to that of language. Unsurprisingly, the existence of just such a mode of mental representation has indeed been postulated, going under the title of 'the language of thought' or 'Mentalese'.[2]

In describing the putative language of thought as being a *language*, we must be wary not to assimilate it too closely to familiar natural languages, such as English or Swahili. The only relevant similarity is structural – the possession of 'syntactical' organisation. Mentalese, if it exists, is a language in which we *think*, but not one in which we *speak* or *communicate* publicly. Moreover, if we do think in Mentalese, we are clearly not consciously aware of doing so: sentences of Mentalese are not disclosed to us when we reflect, or 'introspect', upon our own thought processes. Thus, sentences of Mentalese are not to be confused with 'inner speech' or 'silent soliloquy' – the kind of imaginary dialogue that we often hold with ourselves as we work out the solution to some problem or ponder over a decision we have to make. For we conduct this kind of imaginary dialogue in our native tongue or, at

[2] The most fully developed defence of the language of thought hypothesis, drawing on arguments of the kind sketched in this section, is to be found in Jerry A. Fodor, *The Language of Thought* (Hassocks: Harvester Press, 1976). 'Mentalese' is Wilfrid Sellars' name for the language of thought: see his 'The Structure of Knowledge II', in H. N. Castañeda (ed.), *Action, Knowledge, and Reality: Critical Studies in Honor of Wilfrid Sellars* (Indianapolis: Bobbs-Merrill, 1975). See also Hartry Field, 'Mental Representation', *Erkenntnis* 13 (1978), pp. 9–61, reprinted in Ned Block (ed.), *Readings in Philosophy of Psychology, Volume* 2 (London: Methuen, 1981).

least, in some natural language known to us, be it English or German or some other human tongue.

But why, apart from the foregoing considerations about the productivity of thought, should we suppose that Mentalese exists? Various additional reasons have been offered. One is this. It may be urged that the only way in which one can learn a language is by learning to translate it into a language which one already knows. This, after all, is how a native English speaker learns a foreign language, such as French, namely, by learning to translate it into English (unless, of course, he picks it up 'directly', in which case he presumably learns it in much the same way as he learnt English). But if that is so, then we can only have learnt our *mother* tongue (our first natural language) by learning to translate it into a language our knowledge of which is *innate* (and thus unlearned) – in short, by learning to translate it into Mentalese, or the 'language of thought'. However, although learning a language by learning to translate it certainly is *one* way of learning a language, it may be questioned whether it is the *only* way. Someone hostile to Mentalese could easily turn the foregoing argument around and maintain that, since (in his view) there is no such thing as Mentalese, it follows that there must be a way to learn a language which does not involve translating it into a language which one already knows. But then, of course, it would be incumbent upon such a person to explain what this other way could be, which might not be at all easy. We shall return to this issue later, when we come to consider to what extent our knowledge of language is innate.

Another consideration ostensibly favouring the language of thought hypothesis is that postulating the existence of such a language would enable us to model human thought-processes on the way in which a digital electronic computer operates. Such a device provides, it may be said, our best hope of understanding how a wholly physical system can *process information*. In the case of the computer, this is achieved by representing information in a quasi-linguistic way, utilising a binary 'machine code'. Strings of this code consist of

sequences of the symbols 'o' and '1', which can be realised physically by, say, the 'off' and 'on' states of electronic switches in the machine. If the human brain is an information-processing device, albeit a naturally evolved one rather than the product of intelligent design, then it may be reasonable to hypothesise that it operates in much the same way as an electronic computer does, at least to the extent of utilising some sort of quasi-linguistic method of encoding information. Mentalese might be seen, then, as a naturally evolved 'brain code', analogous to the machine code of a computer. On the other hand, doubts have been raised by many philosophers and psychologists about the computational approach to the mind, some of which we aired in the previous chapter. We shall look into this question more fully in the next chapter, when we discuss the prospects for the development of artificial intelligence. In the meantime, we would do well not to put too much weight on purported analogies between brains and computers. Moreover, as we shall see in the next chapter, there are styles of computer architecture – notably, so-called 'connectionist' ones – which do not sustain the kind of analogy which has just been advanced on behalf of the language of thought hypothesis.[3]

ANALOGUE VERSUS DIGITAL REPRESENTATION

Sentences of a language, as we have just seen, provide one possible model for the mode of mental representation involved in human thought processes. But earlier on we listed many other kinds of artificial representation besides sentences – items such as pictures, photographs, diagrams and

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[3] For evaluation of Fodor's arguments in *The Language of Thought*, see Daniel C. Dennett's critical notice of the book in *Mind* 86 (1977), pp. 265–80, reprinted as 'A Cure for the Common Code?', in Dennett's *Brainstorms: Philosophical Essays on Mind and Psychology* (Hassocks: Harvester Press, 1979) and also in Block (ed.), *Readings in Philosophy of Psychology, Volume 2*. For other criticisms of the language of thought hypothesis and an alternative perspective, see Robert C. Stalnaker, *Inquiry* (Cambridge, MA: MIT Press, 1984), ch. 1 and ch. 2. Fodor further defends the hypothesis in the Appendix to his *Psychosemantics: The Problem of Meaning in the Philosophy of Mind* (Cambridge, MA: MIT Press, 1987).

maps. All of these items involve some element of *analogue* – as opposed to *digital* – representation. The analogue/digital distinction can be illustrated by comparing an analogue clock-face with a digital clock-face. Both types of clock-face represent *times*, but do so in quite different ways. A digital clock-face represents time by means of a sequence of numerals, such as '10.59'. An analogue clock-face represents that same time by the positions of the hour hand and the minute hand of the clock. More particularly, an analogue clock-face represents differences between hours by means of differences between positions of the hour hand, in such a way that the smaller the difference is between two hours, the smaller is the difference between the positions representing those hours (and the same applies to the minute hand). Thus the analogue clock-face represents by drawing upon an analogy, or formal resemblance, between the passage of time and the distances traversed by the clock's hands.[4]

The analogue representation involved in an analogue clock-face is highly abstract or formal. Maps and diagrams are less formal than this, since they bear some genuine *resemblance*, however slight or stylised, to the things which they represent. Thus a map representing some piece of terrain is spatially extended, just as the terrain is, and represents nearby parts of the terrain by nearby parts of the map. Other aspects of map-representation may be more formal, however. For example, if the map is a contour map, it represents the *steepness* of part of the terrain by the *closeness* of the contour lines in the part of the map representing that part of the terrain. A map may also include elements of purely symbolic representation, which qualify as 'digital' rather than 'analogue' – such as a cross to represent the presence of a church (though, even here, the *location* of the cross represents the *location* of the church in an analogue fashion). Pictures and photographs represent by way of even more substantial

[4] For further discussion of the analogue/digital distinction, see Zenon W. Pylyshyn, *Computation and Cognition: Toward a Foundation for Cognitive Science* (Cambridge, MA: MIT Press, 1984), ch. 7.

degrees of resemblance between them and the things which they represent: thus, in a colour photograph which is, as we say, a 'good likeness' of a certain person, the colour of that person's hair resembles the colour of the region of the photograph which represents that person's hair. In this case, the resemblance needs to be of such an order that the experience of looking at the photograph is (somewhat) similar to the experience of looking at the person. But, of course, looking at a photograph of a person isn't *exactly* like looking at a person – and seeing a photograph as representing a person requires *interpretation* quite as much as does seeing a map as representing a piece of terrain.

IMAGINATION AND MENTAL IMAGERY

An obvious question to ask at this point is this. Do any of our cognitive states involve *analogue* modes of representation? How, though, should we attempt to find the answer to this question? Perhaps we could just ask people for their opinion about this, relying on their powers of introspection. But if we ask people whether, for instance, they think 'in words' or 'in images', we find that we get a surprisingly varied range of answers. Some people assert that their thinking is frequently accompanied by vivid mental imagery, while others emphatically deny that they ever experience such imagery and even profess not to understand what is meant by talk of it. Some of the latter people, however, happily assert that they think 'in words' – by which they mean words of some natural language, such as English. But then it appears that their thinking *is* accompanied by mental imagery after all, but just by *auditory* imagery rather than by *visual* imagery.

What, though, is the connection between mental imagery and modes of mental representation? It is dangerously easy to slip into arguing in the following fashion. Mental imagery, whether visual or auditory, manifestly accompanies much or all of our conscious thinking. But mental images are *images* and thus involve analogue representation. Hence, much of our thinking involves analogue modes of representation. One

questionable assumption in this line of reasoning is the
assumption that mental imagery literally involves *images* of
some sort, where by an 'image' is meant something akin to a
picture or a photograph. It is difficult to dispute that we all
engage, at times, in processes of *imagination*. Thus, if someone
instructs me, say, to imagine a white horse galloping across
a green field, I know how to carry out that instruction – I
'visualise' a scene corresponding to the given description. But
we shouldn't assume, just because the term 'imagination' is
derived from the same root as the term 'image', that ima-
gination must therefore involve the production or inspection
of *images* of any kind. It may be that imagination has acquired
this name because people in the past *believed* that it involved
images of some kind. However, we shouldn't assume that that
belief is correct. But – it may be asked – isn't it just obvious
that when you visualise something you *see* something 'in your
mind's eye' – a 'mental picture'? No, it isn't at all obvious
that this is so. The most that can safely be said is that the
experience of visually imagining something is somewhat like
the experience of seeing something. But since it is far from
obvious that the experience of seeing something involves any
kind of 'mental picture', why should it be supposed that the
experience of visually imagining something does? It won't do
to answer here that because, when you visually imagine
something, the thing you imagine needn't exist, there must
therefore be *something else* that really *does* exist and which you
'see in your mind's eye' – a 'mental picture' of the thing
which you are imagining. For why should you have to see
something else in order to visualise something which doesn't
exist?

The question that we need to address at this point is the
following. Granted that much of our conscious thinking
involves the exercise of our powers of imagination, what
reason is there to suppose that processes of imagination
involve *analogue* modes of representation? One way of trying
to approach this question is to ask whether imagining a situ-
ation is more akin to *depicting* it or to *describing* it. Thus, con-
sider again what you do when you are instructed to imagine

a white horse galloping across a green field – and compare
this with what you do when you are instructed to *paint a pic-
ture* of a white horse galloping across a green field. Suppose I
ask you, concerning your imagined scene, whether the sky
was blue or whether there were any trees nearby. In all prob-
ability, you will say that you just didn't think about those
matters one way or the other. But your painting could not
easily be so non-committal. You may have decided not to
include the sky in your picture, but if you did include it, you
will have to have given it some colour. Likewise, you will have
to have made a decision about whether or not to include any
other objects in the picture besides the horse, such as some
trees. In this respect, imagining seems to be rather more like
describing than depicting, because a description is similarly
non-committal about items not explicitly included in the
description. Two famous examples often cited in illustration
of this point are those of the speckled hen and the striped
tiger.[5] When a person depicts such a creature, he or she must
(it is said) depict it as having a determinate *number* of
(visible) speckles or stripes. But when a person imagines such
a creature, it may be futile to inquire how many speckles or
stripes the imagined creature possessed, because the person
imagining it may simply have failed to think about the
matter one way or another. On the other hand, it seems that
imagining is not as *completely* non-committal about such
things as describing is. If I ask you to imagine a striped tiger,
I would expect you to be able to say whether you imagined
it as lying down or as moving and as facing you or as seen
from one side. The bare description of a situation as being
one which includes a striped tiger is, by contrast, com-
pletely silent about such matters. So perhaps imagining does
involve some degree of analogue representation. But maybe

[5] For discussion of the example of the tiger and its stripes and a defence of a
descriptional view of imagination, see Daniel C. Dennett, *Content and Consciousness*
(London: Routledge and Kegan Paul, 1969), pp. 132–41, reprinted in Block (ed.),
Readings in Philosophy of Psychology, Volume 2 and in Ned Block (ed.), *Imagery*
(Cambridge, MA: MIT Press, 1981). Somewhat confusingly, Dennett uses 'depic-
tional' as synonymous with 'descriptional' and contrasts both with 'pictorial'.

it is more like drawing a map or a diagram than painting a picture.

However, the trouble with the foregoing approach to the question just raised is that it still relies on dubious appeal to our powers of introspection. Isn't there a more objective way to settle the matter? Some empirical psychologists certainly think so. They believe that experimental evidence supports the contention that analogue modes of representation are involved in some of our thinking processes. One well-known experimental technique involves showing subjects pictures, projected on to a screen, of pairs of asymmetrically shaped objects, constructed out of uniformly sized cubic blocks. In some cases, both objects in a pair are exactly the same in shape, but one is depicted as having been rotated through a certain angle with respect to the other. In other cases, the two objects in a pair are subtly different in shape as well as in orientation. In each case, after the picture has been removed from the screen, subjects are asked to say whether or not the depicted pair of objects had the same shape. One of the findings is that, when the two objects in a pair have the same shape, the length of time it takes subjects to determine that this is so is roughly proportional to the size of the angle through which one of the objects is depicted as having been rotated with respect to the other. The proffered explanation of this finding – and one which seems to be corroborated by the introspective reports of the subjects concerned – is that subjects solve this problem by 'mentally rotating' a remembered 'image' of one of the objects to determine whether or not it can be made to coincide with their remembered 'image' of the other object. The length of time which it takes them to do this depends, it is suggested, on the size of the angle through which they have to 'rotate' one of the 'images' – on the seemingly reasonable assumption that their 'speed of mental rotation' is fairly constant – thus explaining the experimentally established correlation between the length of time which subjects take to reach their verdict and the size of the angle through which one of the objects was depicted as having been rotated with respect to

the other. If subjects had stored the relevant information about the depicted objects in a 'digital' rather than in an 'imagistic' form, it is urged, there would have been no reason to expect such a correlation.[6]

In another series of experiments which has been claimed to support the hypothesis that 'imagistic' modes of representation are involved in human thinking, subjects learn to draw a map of a fictional island containing a number of depicted objects in various locations, such as a hut, a tree, a rock, and so forth. Then they are asked to imagine the map and focus mentally on a given location on it. Finally, a word is presented to them, which may or may not name an object on the map, and they are asked to 'look' for the object and determine whether or not it is on the map. It is found that subjects take more time to reach a verdict about objects which are depicted on the map as being far away from the location initially focused on than they do about objects which are depicted as being closer to it, whence it is hypothesised that they arrive at their answers by 'mentally scanning' a remembered 'image' of the map, taking more time to scan between locations which are far apart than they do between locations which are close together. If subjects stored information about the locations of objects in a 'digital' form, it is once again urged, this sort of correlation would not be expected.[7] However, an objection to such an interpretation both of these experiments and of the previous ones is that, strictly speaking, all that we can safely conclude is that subjects solve these problems by engaging in exercises of the imagination – and that the cognitive processes involved in imagination, whatever they may be, are similar to those involved in perception. Thus, it is plausible to suggest that the cognitive

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[6] A fuller account of the 'mental rotation' experiments may be found in R. N. Shepard and J. Metzler, 'Mental Rotation of Three-Dimensional Objects', *Science* 171 (1971), pp. 701–3. See also Roger Brown and Richard J. Herrnstein, 'Icons and Images', in Block (ed.), *Imagery*.

[7] For a fuller description of the 'map-scanning' experiments, see Stephen M. Kosslyn, Steven Pinker, George E. Smith and Steven P. Shwartz, 'On the Demystification of Mental Imagery', *Behavioral and Brain Sciences* 2 (1979), pp. 535–81, partly reprinted in a revised form in Block (ed.), *Imagery*.

processes involved in *imagining* that one is scanning a map are similar to those involved in *actually* scanning a map. But whether those cognitive processes involve 'digital' or 'analogue' modes of representation seems to be a further question which is not settled by the fact that similar processes are involved in both cases. For reasons explained earlier, we must be careful to avoid the fallacy of supposing that *imagining* that one is scanning a map must somehow involve a process of *actually* scanning an 'imaginary' map, or an 'image' of a map. *Maps* undoubtedly involve an analogue mode of representation, but it doesn't follow that our *cognition* of maps involves an analogue mode of representation.[8]

Despite this word of caution, there doesn't seem to be any very compelling reason to *deny* that human thinking could involve elements of analogue representation. Against this, it is sometimes urged that images are unsuited to the role of being vehicles of thought because they are always inherently *ambiguous* – and that such ambiguity can only be removed by processes of interpretation which could not themselves essentially involve imagery, on pain of engendering an infinite regress. Often cited in illustration of this sort of ambiguity is Wittgenstein's example of a picture of a man walking up a hill.[9] It is pointed out that this could equally be a picture of a man sliding down a hill. If one tries to remove the ambiguity by adding an arrow pointing uphill, this will succeed only on the assumption that the arrow signifies the direction in which the man is going rather than the direction from

[8] For doubts about the alleged imagistic implications of the map-scanning experiments, see Pylyshyn, *Computation and Cognition*, ch. 8 and 'The Imagery Debate: Analog Media versus Tacit Knowledge', in Block (ed.), *Imagery*. The imagistic view is further defended by Stephen Kosslyn in his 'The Medium and the Message in Mental Imagery: A Theory', in Block (ed.), *Imagery* and, much more comprehensively, in Kosslyn's *Image and Brain: The Resolution of the Imagery Debate* (Cambridge, MA: MIT Press, 1994). A position intermediate between those of Kosslyn and Pylyshyn is defended by Michael Tye in his *The Imagery Debate* (Cambridge, MA: MIT Press, 1991).

[9] Wittgenstein's example of the picture of a man walking up a hill is to be found in his *Philosophical Investigations*, trans G. E. M. Anscombe, 2nd edn (Oxford: Blackwell, 1958), p. 54. This and similar examples are discussed by Fodor in his *The Language of Thought*, pp. 179ff.

which he is coming. Thus, a further act of interpretation is required to remove the ambiguity inherent in the image – and this will always be so, no matter how many more pictorial elements we add to the image. However, it is equally true that *non*-imagistic modes of representation, such as written sentences, are inherently ambiguous, since the same sequence of written words could mean quite different things in different languages. The real point at issue here concerns the distinction between 'original' and 'derived' intentionality, not the distinction between 'digital' and 'analogue' modes of representation. If mental representations – be they digital or analogue – are to have original intentionality, then they must represent whatever they do represent for a reason which does not depend on their being *interpreted* by us in any way. But the fact that humanly constructed analogue representations, such as pictures, do not represent independently of being interpreted by us in certain ways does not by any means imply that elements of analogue representation cannot be involved in human thought processes.

THOUGHT AND COMMUNICATION

So far, we have focused on the question of whether the mode of representation involved in human thought processes is quasi-linguistic in nature or whether, alternatively, it includes elements of analogue representation of an 'imagistic' kind. We have come to no very firm conclusion, but have left open the possibility that quite a wide range of modes of representation are involved. It would not be surprising if that were so. After all, the human brain is not the product of careful planning or design but rather of evolutionary happenstance, so one might expect our cognitive processes to exploit a hotchpotch of different representational strategies rather than a single, uniform one. Moreover, as we have seen, there is no compelling reason to suppose that our powers of introspection provide reliable insight into the modes of mental representation that we (or our brains) deploy. It may be that at least some of our thinking goes on

in a 'language of thought', but, if so, conscious reflection on our thoughts certainly does not reveal this to be the case. However, there is another kind of question that we may ask about the relation between thought and language, this time about what connection there is, if any, between our capacity to think and our capacity to express and communicate our thoughts in a *public* language, such as English or French.

Some behaviourists have held the view that thinking just *is*, in effect, suppressed speech.[10] On this view, as children we learn first to speak, by imitating our elders, and then we learn to suppress the sound of our speech and thereby learn to think silently. One of the many difficulties with this implausible doctrine is that learning to speak is not simply a matter of learning to make certain noises – a parrot can easily do that – but rather a matter of learning how to use words to express one's thoughts. And this implies that a speaker must already be a thinker. However, it doesn't imply that any thought that can be expressed in words is a thought that someone could have who had never learned to speak – understanding 'speaking' in a broad sense, to include the use not just of auditory but also of visual language, such as American Sign Language.[11] Indeed, it is hard to see how someone could have, say, the thought that tomorrow is Tuesday, if he or she had never learned a public language. What sorts of thoughts, then, if any, *are* available to a creature incapable of expressing or communicating its thoughts in a public language? Many apparently languageless animals, such as dogs and apes, are clearly capable of intelligent behaviour. But do they really lack language, or any mode of communication relevantly similar to language? And what does the alleged intelligence of their behaviour imply about their capacity for thought?

[10] A version of the doctrine that thought is suppressed speech is defended by John B. Watson, the founder of scientific behaviourism, in his *Behaviourism*, 2nd edn (Chicago: University of Chicago Press, 1958), pp. 238ff.

[11] For more about American Sign Language, which is an independent language in its own right, see Oliver Sacks, *Seeing Voices: A Journey into the World of the Deaf* (Berkeley and Los Angeles: University of California Press, 1989).

It is not in dispute that many species of animals utilise signalling codes to communicate with one another. Thus, in chapter 4, we discussed the system of alarm-calls used by vervet monkeys to alert their fellows to the presence of various kinds of predator. But such a system of calls differs fundamentally from human language. A true language has syntactical structure as well as vocabulary, enabling its users to construct novel messages almost without limit. This is the basis of the *productivity* of language mentioned earlier in this chapter. By contrast, animal systems of calls are inflexible and narrow in their range of application. Notoriously, attempts have been made to teach true language – usually some form of sign language – to chimpanzees, but without striking success. Occasionally, it seems, a chimpanzee may, on its own initiative, put together two signs in a novel combination, in a way which seems to be semantically significant. But this is still far removed from a human infant's capacity to construct syntactically complex sentences.[12] Yet chimpanzees are undoubtedly clever animals, often displaying considerable ingenuity in their practical and social activities. So to what extent can we attribute powers of *thought* to them? If their cleverness implies that they have capacities for thought akin to our own, why is it that they seem incapable of learning to express their thoughts in language in anything like the way in which humans can?

One possible answer to this last question is that the human capacity for language is a species-specific trait which has little to do with our intelligence. On this view, humans talk much in the way that birds fly and fishes swim: talking is just a kind of activity that evolution has equipped us to engage in and for which we accordingly have an innate propensity. Chimpanzees and other intelligent animals lack this propensity and hence find it as difficult and unnatural to learn to talk as humans do to learn to fly or swim. I shall discuss this

[12] For an overview and discussion of attempts to teach sign language to apes, see Merlin Donald, *Origins of the Modern Mind: Three Stages in the Evolution of Culture and Cognition* (Cambridge, MA: Harvard University Press, 1991), pp. 127–37.

sort of view more fully later in the present chapter. For the time being, I shall only remark that it is hard to suppose that a capacity for language has nothing whatever to do with intelligence. Clever though chimpanzees may be, human beings have intellectual capacities which far outstrip those of other primates, and it seems extremely unlikely that this has nothing to do with our ability to use language. Thus, for example, human beings can solve algebraic equations, design aeroplanes, construct theories about the origins of the universe, and ponder over ethical and legal problems. Chimpanzees, it seems safe to say, can do none of these things. But, equally, it is hard to imagine how human beings could do these things if they did not possess language.

DO ANIMALS THINK?

We are prone to describe and explain animal behaviour in an anthropomorphic way, that is, in a way which unwarrantably likens it to human behaviour. When a dog hears the sound of its owner's feet as he returns home from work, it may snatch up its lead and run to meet him, wagging its tail, as if to express a desire that its owner take it for a walk. But should we literally attribute a *propositional attitude* state to the dog – a desire *that its owner take it for a walk*? We cannot attribute such an attitudinal state to the dog unless we are also prepared to attribute to it the *concepts* which possession of such a state implies: in this case, the concept of an *owner*, the concept of a *walk*, the concept of *itself*, and the concept of *future time*. But it is extremely implausible to suppose that a dog can possess such concepts.[13] To this it might be replied that, while a dog may not possess these *human* concepts, perhaps it can instead possess certain *canine* concepts, which we

[13] Scepticism about the possibility of attributing propositional attitude states to languageless animals is expressed by Donald Davidson in his 'Thought and Talk', in Samuel Guttenplan (ed.), *Mind and Language* (Oxford: Clarendon Press, 1975), reprinted in Davidson's *Inquiries into Truth and Interpretation* (Oxford: Clarendon Press, 1984). For discussion of Davidson's view, see John Heil, *The Nature of True Minds* (Cambridge: Cambridge University Press, 1992), ch. 6.

necessarily lack. On this view, the best that we can do by way of describing the content of the dog's desire is to say that it desires 'that its owner take it for a walk', but the inadequacy here is ours rather than the dog's. However, it is difficult to make coherent sense of such a view. What possible reason could we have to attribute to a creature concepts which it is supposedly impossible for us to understand? Precisely to the extent that we cannot understand what a creature is (supposedly) thinking, to that extent we are in no position to attribute any concepts to it whatever. It won't do just to say that the dog *must* be thinking, and therefore deploying concepts of some sort, because its behaviour is so manifestly intelligent. For either one means here, by 'intelligent behaviour', *behaviour which involves thinking* – in which case the claim just made is simply circular – or else one means something like *behaviour which is well-adapted to the animal's needs*, in which case it is an altogether open question whether it involves thinking of any kind. It is very often possible to explain intelligent behaviour in an animal, in this second sense of 'intelligent behaviour', without supposing that the animal engages in thinking of any kind – and where this can be done, it is clearly more economical to do so than to appeal to an explanation involving the attribution of thought. Thus, in the case of the dog just described, one may quite reasonably explain its behaviour in terms of its having learned to associate the sound of its owner's approaching footsteps with the experience of having the lead attached and being taken out for a walk. Having a capacity to make such an association requires the dog to possess acute senses, but does not require it to possess any concepts or to do any thinking.

Sometimes, however, animals appear to engage in *practical reasoning* in order to solve a problem which confronts them – and if that is really what they are doing then, indeed, it seems that we must be prepared to attribute thoughts to them. Examples which are often cited in this context are those of the chimpanzees which, apparently, learnt without prompting to fit two sticks together and rake in some bananas which were lying beyond their reach outside their

cage, or to push a box beneath some bananas hanging over-
head and climb up it to reach them. Yet, even here, it is
questionable whether genuine reasoning and therefore
thought was involved in the tasks. Even the cleverest of these
chimpanzees was defeated, it seems, when the bananas lying
outside the cage were so placed that it was necessary for the
animal to push them *away* from itself before raking them in.[14]
Practical or means-end reasoning often requires an agent to
perform a sequence of tasks which initially seem to take it
further away from its ultimate goal, because that is the only
or the best way to achieve it. Humans are very good at doing
this, but it is debatable whether animals can do it at all.
It requires forward planning and a grasp of the connection
between present action and future satisfaction of desire. An
intriguing series of animal experiments, which seems to illus-
trate this point well, involved rigging up a feeding bowl in
such a fashion that it would recede from an animal if the
animal tried to approach it, but would come within the
animal's reach if the animal tried to back away from it. The
animals concerned failed to master this problem, which
humans can solve with ease.[15] Part of the explanation, per-
haps, is that only human beings can dissociate their current
actions from the immediate satisfaction of present desires,
because they are able to represent in thought the future sat-
isfaction of a desire as being a consequence of current action.

Clearly, if an animal is incapable of engaging in conceptual
thinking, then it cannot be a language-user in any serious
sense, because it has no thoughts to communicate by means
of language. But more is required of a language-using crea-
ture merely than that it be capable of engaging in conceptual

[14] The famous chimpanzee studies by Wolfgang Köhler are described in his book
The Mentality of Apes, 2nd edn (New York: Viking, 1959). See also Dorothy L.
Cheney and Robert M. Seyfarth, *How Monkeys See the World: Inside the Mind of
Another Species* (Chicago: University of Chicago Press, 1990), especially p. 276.
[15] The implications of the feeding bowl experiment and other investigations are
discussed in Cecilia Heyes and Anthony Dickinson, 'The Intentionality of Animal
Action', *Mind and Language* 5 (1990), pp. 87–104. See also their 'Folk Psychology
Won't Go Away: Response to Allen and Beckoff', *Mind and Language* 10 (1995),
pp. 329–32.

thinking. It needs to possess certain quite specific concepts.
In particular, it needs to be able to conceive of its fellow
creatures, with which it communicates by means of language,
as having thoughts to communicate. In short, it needs to have
something like a 'theory of mind', and thus the concept of a
thought or *belief* as a state of mind with a propositional content
which can be communicated from one thinker to another.
This in turn entails that it must have some grasp of the con-
cepts of *truth* and *falsehood*, since it must be able to conceive
of the beliefs of another thinker as being correct or incorrect.
It must even have some grasp of the concept of a *concept*, as
an ingredient of the propositional content of a thought or
belief. But although some non-human primates, such as
chimpanzees, enjoy a fairly complex social life, it is very ques-
tionable whether they possess a theory of mind in anything
like the foregoing sense.[16] This, then, may help to explain
why such creatures, despite their undeniable ingenuity, are
incapable of learning to use language in the way that humans
do.

A further question which arises at this point is whether
there is any half-way house between those creatures which
are altogether incapable of conceptual thinking and those
creatures, like ourselves, which possess a fully fledged theory
of mind. Some philosophers, notably Donald Davidson, have
argued that a creature cannot *have* beliefs unless it has the
concept of belief, which would imply that no such half-way
house exists and that a capacity for conceptual thinking and
a capacity for language go hand in hand.[17] Against this, it
might be urged that some non-linguistic animals certainly
have *perceptual* states and thus – if perceptual states have con-
ceptual content – that such animals deploy concepts. How-
ever, we should again be wary of the dangers of anthropo-

[16] On the question of whether chimpanzees have a 'theory of mind', see David Pre-
mack, ' "Does the Chimpanzee have a Theory of Mind?" Revisited', in Richard
Byrne and Andrew Whiten (eds.), *Machiavellian Intelligence: Social Expertise and the
Evolution of Intellect in Monkeys, Apes, and Humans* (Oxford: Clarendon Press, 1988).
[17] See Davidson, 'Thought and Talk', in his *Inquiries into Truth and Interpretation*,
p. 170.

morphism. Many animals have highly refined powers of sensory discrimination which should not be conflated with an ability to deploy concepts. Thus, pigeons can be trained to discriminate visually between triangles and squares, but it would be extravagant to suggest that they therefore possess the concepts of triangularity and squareness.[18] To possess a concept, one must possess certain general beliefs involving that concept and relating it to other concepts which one possesses. For example, we should not attribute possession of the concept of a *tree* to someone unless we are prepared to attribute to that person certain general beliefs concerning trees, such as that trees are living things which grow from the ground and have branches, roots and leaves. The mere ability to discriminate visually between trees and other objects, such as rocks, and to engage in distinctive behaviour with respect to them, such as nest-building, is not enough to constitute possession of the concept of a tree.

Indeed, once we recognise that a concept-using creature must possess a whole *system* of concepts, coherently interrelated by a system of general beliefs, we can see why we should be very cautious about attributing concepts to animals which lack the cognitive capacity for language. Such a system of general beliefs will have to involve some highly sophisticated concepts, such as the concepts of *space* and *time*, which are arguably simply not available in the absence of language. A creature which does not merely differentiate sensorily between objects in its environment but perceives them *as objects* and thus as falling under concepts – such as the concept of a *tree*, a *mountain*, a *river*, a *rock*, or a *house* – must also grasp the fact that such objects continue to exist unperceived and can be re-encountered at other times and places. Many animals, such as pigeons and bees, can reliably navigate their way about their natural environment with the aid of such sensory cues as the direction of the sun, but there is no

[18] For doubts about whether nonlinguistic animals can be said to possess concepts, see Nick Chater and Cecilia Heyes, 'Animal Concepts: Content and Discontent', *Mind and Language* 9 (1994), pp. 209–46.

reason to suppose that they conceive of that environment in terms of a unified framework of places and times.[19] Lacking the conception of such a framework, animals are tied to the here and now in a way that humans are not. Humans, and language-users generally, are free to roam in thought over all the vast stretches of space and time and thus to reflect on past happenings and contemplate future possibilities. No creature lacking this freedom can have a conception of *itself* as an enduring subject of experience with a personal history and a capacity to choose between alternative courses of action.[20]

NATURAL LANGUAGE AND CONCEPTUAL SCHEMES

We may be inclined to conclude, in the light of the foregoing considerations, that the human capacity for conceptual thinking is something unique to our species and intimately related to our ability to express and communicate thoughts in a public language – though, rather than say that language depends on thought or thought on language, as though these were mutually exclusive alternatives, it may be more plausible to say that language and thought are *inter*dependent. However, if such an interdependency exists, then it raises further important questions, in view of the great diversity of languages spoken by human beings across the world. To what extent, if any, are the concepts which a person is capable of deploying dependent upon the vocabulary and syntax of the natural language which he or she has learnt to speak? Answers to this question have varied widely. Thus, it is often alleged that Eskimos have many more words for different

[19] For discussion of the navigational capacities of animals and their implications for animal spatial cognition, see John Campbell, *Past, Space, and Self* (Cambridge, MA: MIT Press, 1994), ch. 1.
[20] I say more about the gulf between human and animal cognitive capacities in my 'Personal Experience and Belief: The Significance of External Symbolic Storage for the Emergence of Modern Human Cognition', in Chris Scarre and Colin Renfrew (eds.), *Cognition and Culture: The Archaeology of Symbolic Storage* (Cambridge: McDonald Institute for Archaeological Research, 1998). See also John McDowell, *Mind and World* (Cambridge, MA: Harvard University Press, 1994), pp. 114–24.

kinds of snow than do Europeans and consequently a larger repertoire of concepts for thinking about snow. In fact, this claim appears to be completely unfounded, although the myth is very difficult to eradicate.[21] Again, it is often remarked that the colour vocabulary of languages varies widely, from which it is sometimes inferred that speakers of different languages have different colour concepts and even *see* coloured things in quite different ways. However, the range of hues which human beings are able to distinguish is pretty much determined by the physiology of our visual system, quite independently of the colour concepts which we happen to deploy.[22] It would be foolish to conclude, just because speakers of a certain language have no word which translates into English as 'blue' as opposed to 'green', that therefore they cannot visually distinguish blue things from green things. After all, English speakers can distinguish many different hues for which the English language has no name. Moreover, where English fails to supply a name for a certain hue, it still provides us with the resources with which to describe it: for example, one might describe a certain unnamed hue as being 'the colour of kiwi fruit'. This example brings out the difficulty inherent in any claim to the effect that the *vocabulary* of a language restricts the range of concepts expressible in it. For, given the productivity of language which its syntactical structure confers upon it, it is often (perhaps, indeed, always) possible to translate a single word in one language by a complex phrase in another, even if the second language lacks a single word which will do the job on its own.

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[21] For an amusing debunking of the myth about Eskimo words for snow, see Geoffrey K. Pullum, *The Great Eskimo Vocabulary Hoax and Other Irreverent Essays on the Study of Language* (Chicago: University of Chicago Press, 1991), ch. 19.

[22] For discussion of the relation between colour perception and colour vocabulary, see Paul Kay and Chad K. McDaniel, 'The Linguistic Significance of the Meanings of Basic Color Terms', *Language* 54 (1978), pp. 610–46, reprinted in Alex Byrne and David R. Hilbert (eds.), *Readings on Color, Volume 2: The Science of Color* (Cambridge, MA: MIT Press, 1997). For an opposing view, see B. A. C. Saunders and J. van Brakel, 'Are There Nontrivial Constraints on Color Categorization?', *Behavioral and Brain Sciences* 20 (1997), pp. 167–228.

A rather more interesting suggestion, however, is that the *grammar* or *syntax* of a language imposes constraints upon the 'conceptual scheme' deployed by its speakers. This thesis is generally known as the 'Sapir-Whorf hypothesis', named after two American linguistic anthropologists, Edward Sapir and Benjamin Lee Whorf.[23] By a *conceptual scheme*, here, is meant something like an overall system of categories for classifying items in the world which speakers want to talk about. The grammatical categories of Indo-European languages seem to map onto the ontological categories of Western metaphysics and this, it is suggested, is no accident. Thus substantive nouns, such as 'table' and 'tree', denote *substances*. Adjectives, such as 'red' and 'heavy', denote *properties*. Verbs, such as 'walk' and 'throw', denote *actions*. Prepositions, such as 'under' and 'after', denote *spatial and temporal relations*. And so on. But other families of languages, such as the American Indian languages studied by Sapir and Whorf, allegedly have different grammatical categories, suggesting that speakers of them operate with a conceptual scheme quite different from ours. Thus, Whorf claimed that speakers of Hopi do not operate with an ontology of substances – persisting material things and stuffs – and do not think of space and time separately, as Western Europeans do. Indeed, he implied that their ontology is rather closer to the ontology of modern relativistic physics, which talks in terms of *events* and a unified *spacetime*. At the same time, he suggested that it is not really possible for us to grasp this alien conceptual scheme, so radically different is it from the one embedded in our own language. He even went so far as to suggest that speakers of these alien languages inhabit a different *world* from ours, because categorial distinctions are something which speakers impose or project upon reality

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[23] For Whorf's views, see *Language, Thought and Reality: Selected Writings of Benjamin Lee Whorf*, ed. John B. Carroll (Cambridge, MA: MIT Press, 1956). For a critical evaluation of them, see Michael Devitt and Kim Sterelny, *Language and Reality: An Introduction to the Philosophy of Language* (Oxford: Blackwell, 1987), ch. 10.

rather than discover within it. Clearly, this is a strongly anti-realist or relativist way to think about the ontological structure of the world that one inhabits.

It should not be surprising that there is some degree of correspondence between grammatical and metaphysical categories, though whether this correpondence indicates a relationship of dependency between syntax and metaphysics – and if so, in which direction – is a further question. What is altogether more contentious, however, is the suggestion that speakers of one language may simply be unable to grasp the conceptual scheme adopted by speakers of another – that, in some cases, there is no real possibility of translating between two languages, because the conceptual schemes associated with them are so radically incommensurable. The problem with this thesis, as with the earlier suggestion that non-human animals operate with concepts which we cannot grasp, is that it appears to undermine itself. For the only evidence we can have that a community of creatures are genuine *language*-users is evidence that enables us to interpret certain of their actions as attempts to communicate specific thoughts by means of language. But if we are, allegedly, unable to grasp the contents of their thoughts, then we are prevented from interpreting their actions in that way. Thus, it seems, we can only have reason to regard other creatures as language-users if we can suppose ourselves able to *translate* much of what they say, which requires them not to operate with a conceptual scheme radically incommensurable with our own. This sort of consideration, as Donald Davidson has emphasised, puts pressure on the very idea of a 'conceptual scheme' and the anti-realist or relativist views which generally accompany it.[24]

The difficulty which we have just exposed is readily illustrated by tensions in Whorf's own claims. Thus, on the one hand he urges that it is not really possible for Western Europeans to grasp the Hopi conceptual scheme, so different is it

[24] See Donald Davidson, 'On the Very Idea of a Conceptual Scheme', in his *Inquiries into Truth and Interpretation*.

from ours. But then, paradoxically, he attempts to back up this claim by describing to us – *in our own language*, of course – some of the ways in which their conceptual scheme allegedly differs from ours, such as in not separating time from space. But evidently we must, after all, be able to grasp something of that scheme, if Whorf is to succeed in this attempt. Indeed, he himself must have been able to grasp something of it, despite having a Western European background. Furthermore, Whorf implicitly concedes that Western European languages, despite their alleged bias towards a substance ontology, have not prevented speakers of them from devising various different ontological frameworks in the course of formulating new scientific theories. Indeed, he even suggests that one of these frameworks – that presupposed by Einstein's General Theory of Relativity – is closer to the conceptual scheme of Hopi speakers than to that of traditional Western metaphysics.

The most, it seems, that we can safely conclude is that there is some connection between the syntax of a natural language and the 'common-sense' or 'intuitive' metaphysics espoused by speakers of that language – but that this does not in any way prevent those speakers from constructing novel and very diverse metaphysical theories nor from understanding the 'intuitive' metaphysics of speakers of other natural languages, no matter how different their syntax may be. Speakers of different languages may conceptualise the world in somewhat different ways, but we all inhabit the *same* world and necessarily have a good many beliefs in common. Beliefs are made true or false by states of affairs in the world, not by us, and a creature most of whose beliefs were false would have poor prospects for survival. But if I and another creature had radically different beliefs, we could not plausibly *both* have beliefs which were mostly true. And I cannot coherently suppose my own beliefs to be mostly false. Hence, it seems, I can only have reason to regard another creature as possessing beliefs to the extent that I can consider it to share many of my own beliefs and many of those beliefs to be true. Radical relativism is a doubtfully coherent doctrine and certainly not

one that is supported by anthropological-cum-linguistic evidence of the kind which Whorf advanced.

KNOWLEDGE OF LANGUAGE: INNATE OR ACQUIRED?

Earlier on, I touched on the thesis that the human capacity for language is a species-specific trait. More particularly, it is has been claimed, most famously by the linguist Noam Chomsky, that all humanly learnable languages share certain fundamental syntactical features or 'linguistic universals', knowledge of which is innate in all human beings.[25] This innate knowledge is supposed to explain various otherwise inexplicable facts about human language-learning. First of all there is the fact that all human children (apart from those that are severely mentally handicapped) are able to learn, as their first language, any one of the thousands of human languages spoken on the planet – whereas no creature of another species has ever succeeded in doing so. Moreover, all children learn to speak at pretty much the same rate, developing their ability in very much the same way, quite independently of their level of general intelligence. They do this quite rapidly in their early years and manage it without being explicitly taught by their elders. Somehow, children easily acquire the ability to construct and understand novel sentences, correctly formulated according to the syntactical rules of the language which they are learning, despite the fact that the only empirical data which they have to go on are the highly selective and often unfinished or interrupted utterances of speakers around them.

[25] Chomsky's current views are very readably presented in his *Language and Problems of Knowledge* (Cambridge, MA: MIT Press, 1988). See also the entry 'Chomsky, Noam', written by himself, in Samuel Guttenplan (ed.), *A Companion to the Philosophy of Mind* (Oxford: Blackwell, 1994), pp. 153–67. Chomsky now contends that not only the syntax of natural language but also the concepts expressible in it have an innate basis. The latter claim is also advanced by Jerry Fodor in 'The Present Status of the Innateness Hypothesis', in his *Representations: Philosophical Essays on the Foundations of Cognitive Science* (Brighton: Harvester Press, 1981). For criticism of this claim, see Hilary Putnam, *Representation and Reality* (Cambridge, MA: MIT Press, 1988), ch. 1. Fodor has recently changed his mind about the innateness of concepts: see his *Concepts: Where Cognitive Science Went Wrong* (Oxford: Oxford University Press, 1998).

Clearly, children cannot simply be learning by a process of imitation or inductive extrapolation from the linguistic data to which they have been exposed, because those data on their own are generally insufficient to enable them to predict correctly whether a certain sequence of words, which they have not previously heard, is compatible with the syntactical rules of the language which is being spoken by their elders. Unless there is some constraint on the possible form of those rules, which is already implicitly grasped by the children, it seems that it must be impossible for them to achieve what they do. But if they already know, tacitly or implicitly, that the language which they are learning has a syntax which conforms to certain general principles, then they may be in a position to use the linguistic data to which they have been exposed to eliminate all but one possible set of syntactical rules for the language in question. In effect, they can reason like scientists who use empirical data to eliminate all but one of a finite number of mutually exclusive hypotheses concerning some range of natural phenomena.[26]

But how seriously can we take this analogy with scientific reasoning? And how literally can we talk of children having an innate *knowledge* of syntactical principles which linguists themselves have managed to discover only by means of extensive empirical research? Such innate knowledge, if it exists, will have to be *represented* in the mind or brain in some fashion, but how? Of course, if there is an innate 'language of thought' or 'brain code', of the sort discussed earlier in

[26] For the analogy between language-learning and scientific reasoning, see Noam Chomsky, *Language and Mind*, 2nd edn (New York: Harcourt Brace Jovanovich, 1972), pp. 88ff. In his more recent work, Chomsky rather distances himself from this analogy. This is partly because he no longer thinks that different languages are, strictly speaking, governed by different sets of syntactical rules, but rather that a single set of very general grammatical principles applies to all human languages, which differ from one another in respect of the different values they take for certain 'parameters'. He now sees language-acquisition as a matter of the mind – or, rather, a dedicated module within it – setting the values of these parameters on the basis of the linguistic data made available by experience. However, it is not clear that these changes can help to alleviate worries of the sort that I am about to raise. For wide-ranging discussion of Chomsky's views, see Alexander George (ed.), *Reflections on Chomsky* (Oxford: Blackwell, 1989).

this chapter, then that could provide the required vehicle of representation. Then, indeed, the task of learning one's 'first' language could be assimilated to that of learning a 'second' language: it could be done by learning to translate it into a language which one already knows, namely Mentalese, with the aid of already known general principles of human grammar. An apparent difficulty with this proposed assimilation is that it seems to conflict with the earlier claim that there is something distinctive and remarkable about the ease with which we learn our 'first' language. Perhaps the two propositions can be reconciled by emphasising that learning to translate into Mentalese is something that is done unconsciously by a module of the brain especially dedicated to that purpose, rather than by exercising our general powers of intelligence. However, many philosophers will feel uncomfortable with the suggestion that a part of our brain does unconsciously something akin to what scientists do when they settle upon the truth of a hypothesis by eliminating various possible alternatives. This looks suspiciously like an example of the 'homuncular fallacy' – the fallacy, that is, of trying to explain how human beings achieve some intellectual task by supposing that they have inside their heads some agency, with some of the intellectual powers of a human being, which does that task for them. (Literally, 'homunculus' means 'little man'.) Such an 'explanation' threatens to be either vacuous, or circular, or else vitiated by an infinite regress. We may agree that children could not possibly learn their 'first' language by mere inductive extrapolation from the linguistic data to which they are exposed. But we should not too readily suppose that the only alternative hypothesis is that they learn by drawing on innately known principles of universal grammar. Perhaps we should just hope that someone will one day devise an explanatorily adequate hypothesis which seems less extravagant. Such a hypothesis may conceivably be made available by the 'connectionist' models of cognition to be explored in the next chapter. For it has been advanced on behalf of such models that they can simulate, with surprising fidelity, salient features of children's acquisition of certain grammatical

rules – such as the rules governing the past tense of English verbs – without invoking anything akin to innate knowledge of universal grammar.[27]

CONCLUSIONS

As we have seen in this chapter, questions about the connections between thought and language are many, complex, and highly contentious. But they divide into two main areas of concern: (1) questions to do with whether thought itself involves a linguistic or quasi-linguistic medium or mode of representation, and (2) questions to do with whether a capacity for genuine propositional thinking goes hand-in-hand with a capacity to express and communicate thoughts in a public or natural language. These two areas of concern are in principle distinct. Thus, it would be possible for a philosopher to maintain that animals incapable of communicating thoughts in a public language may none the less *have* thoughts whose vehicle or medium is a quasi-linguistic 'brain code'. On the other hand, those philosophers and psychologists who believe that thinking *just is* either 'suppressed speech' or imagined 'silent soliloquy', and thus has natural language as its medium, will obviously have to deny that languageless animals and pre-linguistic human infants are capable of thought. However, we have concluded, albeit only tentatively, (1) that human thinking quite possibly exploits various modes of mental representation, some of them of an 'analogue' or 'imagistic' character, and yet (2) that there is probably a relationship of mutual dependency between having a capacity for genuine conceptual thinking and having an ability to express and communicate thoughts in a public language. We have seen reason to doubt whether it is

[27] See D. E. Rumelhart and J. L. McClelland, 'On Learning the Past Tenses of English Verbs', in David E. Rumelhart and James L. McClelland (eds.), *Parallel Distributed Processing, Volume 2: Psychological and Biological Models* (Cambridge, MA: MIT Press, 1986). For discussion, see William Bechtel and Adele Abrahamsen, *Connectionism and the Mind: An Introduction to Parallel Processing in Networks* (Oxford: Blackwell, 1991), chs. 6 and 7.

legitimate to attribute concepts to animals incapable of true language, even including animals with the advanced practical and social skills of chimpanzees. But it is debatable whether an ability to learn a language is, as some innatists maintain, simply a species-specific trait of human beings which has little to do with our level of general intelligence. Finally, even granting that there is an intimate relation between thought and its public linguistic expression, it does not seem justifiable to maintain, with the linguistic relativists, that a speaker's natural language confines his or her thoughts within the scope of a specific 'conceptual scheme', much less that it imposes a particular ontological structure on the speaker's world.