It must be by now common knowledge that the “cognitive revolution” that gripped the fields of psychology and philosophy in the 1950s and 60s originated in Cambridge, Massachusetts, where a particular intellectual milieu was then forming around Noam Chomsky. Chomsky’s prominence among the scholars who brought about a change of perspective in the study of cognition, still dominant today, is certainly well-earned. But the contributions of the philosopher Jerry Fodor, perhaps second-best among this group of cognitive scientists, as they were to be known from then on, may well prove to be more enduring in the long run. So it is only fair for Fodor to have been now honoured with a festschrift.

It’s not that Fodor hasn’t received plenty of attention before, including in the very pages of the London Review of Books (Darwin was said to have got something wrong).1 No-one would deny he has been a central figure in cognitive science. But it is also true that the attitudes of some academics towards Fodor’s work, towards him in fact, have sometimes been rather curious. I have witnessed some of these sentiments many times in academia, probably because I mention Fodor’s work often in conversation and academics love to typecast potential targets. You can be quickly turned into a Fodorian if you subscribe to any of his ideas, and this is rarely meant as a compliment. (Much the same applies if you allude to Chomsky, becoming a Chomskyan; someone once searched for ‘Lobina Chomsky lackey’ on Google).

Indeed, as a PhD student I once approached a famous philosopher at a party to ask him how his views squared with those of Fodor’s, knowing full well that they stood as far apart as one could imagine. He didn’t have to answer. One of his PhD students overheard my question, turned to us, frowned slightly and whilst nodding sarcastically—thus—dismissively, simply said: ‘yeah, well, he’s “funny.”’. An improvement in my status hasn’t saved me from such ripostes. As a postdoctoral fellow at Oxford I once pointed out to a barrister-cum-philosopher of some note that what he was arguing for didn’t quite work because of an argument of Fodor’s regarding...only to be interrupted with a brisk ‘let’s not assume that because Fodor has said so’ (he didn’t seem interested in what the argument actually was). And just recently I was talking to a colleague about a course I was teaching on language and thought. Oh, he sighed, Fodor. Not quite, I said, it is more about my own... Oh, he interjected, Chomsky then.

On Concepts, Modules, and Language is thankfully free of these rather unhelpful reactions. Roberto de Almeida and Lila Gleitman, the editors of the volume, have brought together some of Fodor’s former colleagues and collaborators to discuss his work (this includes Chomsky), the only constraint a thematic one. Or rather two. Each contribution was asked to critically engage with one of two ‘big topics’ close to Fodor’s heart: the architecture of the human mind and the character of the mental language in which we think, what Fodor calls the language of thought. It is precisely because of the nature of these two topics, and because of the nature of the things Fodor has said about them, that I think Fodor will have the last laugh in the long run (wouldn’t he like that).2

Fodor is most famous among psychologists for his thesis that there is a tripartite division to the human mind, a position he first defended in his celebrated 1983 monograph The Modularity of Mind (the book was the result of a graduate course he co-taught with Chomsky

2 I should state that I have a paper in the volume under review, but I shall only discuss the work of prominent scholars here. This is not a recursive review.
at MIT). Squarely focused on quintessential psychological phenomena such as visual perception and language comprehension, Fodor argued that these are mental processes that can be subdivided into different stages, each stage requiring a different type of account and thus engaging a separate component of the mind.

The first stage involves sensors that react to environmental inputs such as light and sound waves, in the case of vision and language, and convert these energies into internal signals for the nervous system to analyse. And so its study is best left to the psychophysicist. The second stage is where psychologists earn their keep, according to Fodor. Visual perception and language comprehension are more-or-less modular: among other things, they proceed largely independently of a person’s overall background knowledge. Such a stance went against the dominant view at the time (the so-called new look school of psychology) but this didn’t give Fodor any cause to pause – ‘cause to pause’ doesn’t mean ‘to stop’, as he might have put it.

What Fodor had in mind can be described in rather intuitive terms. Knowing the details of many visual illusions doesn’t prevent you from experiencing them, nor does knowing that in the real world bananas can’t take a bite at anyone prevent you from understanding what the sentence the banana bit the linguist means. Try telling yourself that Müller-Lyer was wrong and his two lines are not of the same length; your visual system will be happy but you will be wrong in believing that they. And if you believe that bananas can indeed bite, all for the better, but your linguistic abilities will not notice a difference. In both cases, perception and language comprehension seem to operate in accordance to their own programmes. They behave like little machines, following a specific code. The two examples I have used are obviously quirky, but the point is supposed to apply to modular processes in general. Vision and language comprehension resist the influence of what one knows and believes about the world in the case of ordinary day-to-day inputs too.

This is not to say that what you see and hear is entirely independent of your overall knowledge. What you see and hear can certainly interact with your beliefs about the world, and in a way that new beliefs are constantly being created. As an unlikely and silly example, imagine seeing and hearing a cat that talks – that would surely change some of your beliefs about the world. This constant updating of one's beliefs, perhaps the hallmark of what it means to ‘think’, takes place at what Fodor calls the ‘central systems’, the last of his tripartite vision of the mind.

Remarkably, Fodor argued that no-one really knows how to study the central systems, because the data we need to consider to do so is not delimited in any principled way: any bit of information from one’s overall belief system is potentially relevant when it comes to thinking about the world. Where is one to start? This is not so for the modular systems, as the relevant information is presumably easily identifiable and appropriately constrained in each case (visual in perception, linguistic in language comprehension, etc.). In fact, it is because of this property of modular processes that Fodor thought cognitive psychologists could make a living.

As Fodor was well aware, how many mental modules there actually are is something that needs to be experimentally established, and his book provided the means to do just that. He argued that modular processes typically exhibit a number of properties (they are fast, automatic, etc.), and so it is up to the psychologist to find out how many processes are like that. There has been some tinkering with the original set of properties in the intervening 40 or so years, but the claim that modular systems are more or less impervious to one’s overall knowledge has remained the most important feature, the defining feature of Fodor’s modularity thesis in fact.

There was plenty of resistance when the thesis came out and many psychologists will now no doubt counter that such a view of the mind has by now been superseded, and my own description is necessarily a simplification. De Almeida & Gleitman are certainly aware of this,
and it is unsurprising that the bulk of their volume – 8 out of 12 chapters – is devoted to the modularity of language comprehension. Remarkably, for the most part these chapters argue that much of the available evidence, when correctly evaluated, is perfectly compatible with Fodor’s modularity of mind. The contribution of Fernanda Ferreira and James Nye, in particular, shows that at least some information from long-term memory is clearly unavailable and inaccessible to language comprehension, and this is what a modular process amounts to in the end. There is little about visual perception in the book, the other major modular process, but I think a similar conclusion is warranted here too (the work of Fodor’s long-term colleague and friend Zenon Pylyshyn would so indicate).

The case of language raises a nuanced complication for Fodor’s view of the mind, however. As Chomsky points out in his contribution, language is not only an input, comprehension-driven system, it is also an output system. That is, we don’t only comprehend the language we are exposed to, we are also capable of producing much language, often within ourselves (as in interior monologue). And we can do this because we are in possession of a special type of “knowledge” regarding our own language (or languages). I use scare quotes to refer to linguistic knowledge because this is not a type of knowledge we are aware of – it is not something we can consciously access. No doubt many will claim to know a fair amount about their own language, but this is typically not the sort of below-the-surface stuff linguists are interested in.

One way to showcase what it means to have knowledge of language is to draw attention to the ability of telling good and bad sentences apart in our own language. This is not simply a case of being able to identify unnatural sentences in the speech of non-native speakers, though that is also part of it. There are many divergences among native speakers too, as in the fact that for some English speakers the sentence John donated the library some books is fine but for many others isn’t, and this needs to be explained somehow. Try asking David Crystal why this is the case, and it is likely he won’t have a very good answer. We have to rely on the very laboured efforts of linguists to tell us what language is actually like, and I bet many readers would be amazed at the complexity of some of the linguistic theories available on the market (this may be one of the reasons for why the field of linguistics hardly ever makes it into the popular press, apart from general questions about grammar and usage).

How does knowledge of language fit in within Fodor’s view of the mind? Is it part of the central systems, the modular input systems, or somewhere in between? Chomsky provides an answer in terms of mental systems dedicated to acquiring things like language, thus eschewing all mention of either beliefs (Fodor’s own take on the matter) or the comprehension and production of language. It is fair to say, however, that the issue remains somewhat unresolved and perhaps Fodor’s modularity thesis is not entirely conducive to a satisfactory placement of linguistic knowledge within our minds.

In any case, Fodor’s thesis remains the starting point for the study of the nature of the architecture of the mind, and for many scholars that would be legacy enough. But Fodor’s impact will prove to be more substantial than simple fodder for future critics. This is on account of a little problem Fodor has insisted on for as long as I can remember, though it is not as well appreciated as it should be. This problem is inextricably linked to Fodor’s language of thought hypothesis, his main claim to fame among philosophers, a hypothesis that is in itself a complex of ideas.

By the language of thought hypothesis philosophers usually refer to two separable but easily conflated ideas, both of which Fodor holds but which not everyone must. The first involves a revival of the old doctrine that we think in a mental language that is not a spoken language. Traceable back to Aristotle, Boethius and William Ockham, the idea is premised to a large extent on the general observation that speakers of different languages can refer to the very same ‘things’, though they may employ different words to talk about them. As the French philosopher Claude Panaccio has aptly put it in a recent historical overview of the mental
language idea, the French can talk about un homme whereas the English would say a man and the ancient Romans homo, but they all would have had the same ‘idea’ in mind – the same concept, as cognitive scientists would call such things. And the same logic applies to the sentences in which these words can appear: homo currit, un homme court, and a man is running are just different ways to describe the same event (the same possible thought). At the very least this indicates a general intertranslatability among probably all of the world’s languages, and the language of thought hypothesis would explain why and how.

Behind the words of a language lie concepts and behind linguistic sentences lie combinations of such concepts; beliefs and thoughts are just particular combinations of concepts. In this sense, the language of thought would be the common code in which concepts are couched, thus explaining how speakers of different languages can at all entertain the same sort of thoughts. We all think in the (more-or-less) same mental language, a conceptual representational system that allows us to make sense of the world. Fodor has provided much detail regarding what the language of thought is like, but it is telling that he once felt rather blasé whilst reading the work of William of Ockham on the mental language, a scholar who lived in the 14th century.

The second idea underlying the language of thought hypothesis is not as straightforward to explain but is closer in spirit to the modularity of mind thesis. This is the claim that mental processes such as visual perception and language comprehension, as well as some of the processes that combine concepts with other concepts in the mental language, are computational in nature and thus not so different to what your computer does when it executes a given programme. The computer analogy is possibly the foundational principle of cognitive science, though there are very different perspectives on what types of computations the mind/brain carries out. For Fodor the language of thought provides the medium in which at least some mental computations are executed, much as a laptop uses numbers as a representational system to compute a given task (aall a computer does at one level is combining 1s and 0s).

An important point in favour of this view of mental processes is the fact that though the signal the modular systems receive tends to be of rather poor quality, what is actually perceived – what one perceives, that is – is fairly rich. Indeed, the details of the acoustic analysis of any uttered sentence are a far cry from the percept you experience during language comprehension. There is a fairly large gap between the sensorial input and what one experiences, and this is because the (modular) systems that process visual and linguistic inputs go beyond what they receive. They enrich the input in a way, and they do so by performing specific types of computations on them.

Fodor has defended both ideas since the publication of his 1975 book The Language of Thought, and despite many changes in his thought since then, these two ideas have certainly endured in his mind. The Language of Thought also introduced Fodor’s ultimate claim to everlasting importance. It is the revival of another old idea, this one traceable back to Plato and Descartes. It is a rather radical idea and yet completely true. It has disturbed my sleep on many occasions and should spoil the sleep of others a lot more than it currently does. Some will claim the problem has already been solved, but it has only been circumvented – or worse, ignored. The idea itself is a deceptively simple one: you can’t mentally represent what you can’t represent.

It sounds like a flippant thing to say, but the message is rather profound. Here’s a few examples, starting with the aforementioned intertranslatability of languages. What does intertranslatablity actually mean? Not that there is a one-to-one mapping between the words of one language and the words of any other language. Very often there isn’t one. But the message that you can communicate in one language can always be rendered in any other language, and in the absence of the relevant words. The experience of conversing with the speaker of another language who insists that there is a word in their language that can’t be
translated into ours, the accompanying suggestion often being that they have a concept that we don’t, must be a common one. But this is usually followed by an explanation of the meaning behind the mysterious word by way of a paraphrase, and we all learn a new concept right there and then. One language may need a phrase where another makes do with a single word, but once you grasp the idea behind the unknown word you don’t need the paraphrase anymore, as we have the means to represent the new concept and all it remains to do, if needed, is to coin a word for this concept in our own language.

Why is all this so important and indeed profound? Imagine English didn’t have the word every (or a synonymous expression). How would we communicate the thought behind a sentence such as every man is mortal? We would have to use a very different strategy, perhaps a very long series of conjunctions: David is mortal and Mark is mortal and Michele is mortal and... But as Fodor once put it, the alternative doesn’t quite get the meaning of every man is mortal and the ellipsis basically gives up trying. If English didn’t have the word every, English speakers would not be able to express thoughts such as EVERY MAN IS MORTAL (philosophers like to use capital letters for concepts and combinations of concepts). And if the language of thought was such a truncated form of English, we wouldn’t be able to think such thoughts, only approximations of them.

And here lies a paradox: if a spoken language can’t express certain thoughts is because it doesn’t have the means to do so and there’s nothing it can do about it. The impoverished version of English I have described doesn’t have the means to construct the meaning of every man is mortal, and thus truncated English would never become full English. And if the language of thought was like that, then it wouldn’t be possible to form such thoughts in it. Said otherwise, and in terms Fodor liked to use, it is impossible to learn a language (spoken or mental) that is more expressive than the language you already have.

Fodor has insisted upon this point throughout his career; it certainly affects a large variety of phenomena. An early target of his was Jean Piaget’s constructivist theory of children’s cognitive development. According to Piaget, children go through a number of stages until they reach full cognitive maturity by about age 16. Strikingly, each new stage is qualitatively more sophisticated than the previous one, but how children construct the new stage with the apparent impoverished tools of the previous stage is something that was left unexplained. Piaget made a number of observations about the abilities children demonstrate at different ages and delineated what tools they seemed to have at each one of the stages he postulated, but he didn’t pay sufficient attention to the problem of how the abilities of the new stage replace the abilities or tools of the previous stage. (Piaget was also wrong about the abilities children exhibit at each stage – he underestimated these – but this is by the by now.)

This is known as the ‘learning paradox’ in educational circles, but it may well be called Fodor’s paradox. A particularly curious phenomenon is children’s development of counting and adding abilities. Children in preschool years make a transition, apparently without any instruction, from a crude system of counting to a more sophisticated one. Asked to add 3 objects to 2 objects (3+2), children initially start counting the first set of objects and then move on to counting the second set of objects. That is, they count 1-2-3 and then move on to the next set of objects and count 4-5. If you then ask them to add 3 objects to 4 objects, they start from the beginning again, counting 1-2-3 and then 4-5-6-7, even though they have previously counted the first 3 objects and this step needn’t be repeated. At one point, however, children simply ‘see’ that you don’t need to start counting the first set of objects anew each time, as one can simply add the second set of objects to the first. But to do so children need to understand the notion of cardinality: a series of facts about the number of elements in a set.

And of course to ‘see’ such a solution is to venture into Fodorian territory. The new solution presupposes being able to entertain—thus—represent a more sophisticated form of counting and adding. And how do children do that? They are not constructing the more sophisticated
method from the previous form, as employing the cruder method doesn’t allow for this. The cruder method doesn’t employ the concept of cardinality, nor does it create it, and yet children must nonetheless be able to antecedently entertain it, and explicitly so. That is, the relevant facts about cardinality must be codified in the mental language in a way that thinking processes can productively use, just in the way that computer data can be explicitly coded in binary code. (As in the case of knowledge of language, none of this would be accessible to consciousness.)

The paradox shows up in many other cases, especially if they are closely connected to learning or developmental issues (it is a learning paradox, after all). The psychologist James Hurford has defended an account of language evolution that clearly falls victim to Fodor’s paradox. Hurford has modelled his account of how language emerged in our species on Michael Tomasello’s theory of how language is learned by our species, possibly on the understanding that ontogeny recapitulates phylogeny (Ernst Haeckel’s famous phrase). According to Tomasello, language acquisition is a constructionist phenomenon: children’s knowledge of language becomes more sophisticated as they use and reuse the pieces of language they learn. And so for the evolution of language: from the rather simple systems of the first language users to our modern abilities via descent with modification. But Hurford and Tomasello, much like Piaget before them, don’t show us how children actually go from one stage to the next, so we are really in the dark as to how our species could have gone from being rudimental language users to writing Stephen Hero. To be a Fodorian is to marvel at all this.

Not that Hurford and Tomasello are at all worried, but this is not because they have solved the paradox; they are unconcerned and simply ignore it. This is rather widespread, but it is certainly unfortunate. There are two possible reasons for this situation. The first has to do with the sweeping conclusions Fodor drew from his own argument, which have generated much resistance. The second is the widespread belief that the force of the argument is forever wedded to the model of learning Fodor has been keen to use to make his point.

Fodor’s own conclusion was that we must come to the world with a lot of innate and explicit information about it, in terms of either the language of thought per se or the actual concepts that we have (or at least some way to construct them). Needless to say, most people have resisted Fodor’s innate tendencies regarding what concepts we have from birth. The concepts ‘carburettor’ and ‘horse’ cannot be innate, most have chosen to agree, and presumably very few would be.

Wherever the nativist chips may fall, it has been supposed that Fodor’s conclusion follows from his use of the so-called hypothesis testing model of learning, the theory then en vogue in the 1960s. The model is supposed to apply to rats trying to find their way around a maze as much as to children trying to figure what a given word means. The process itself is fairly simple: the organism formulates a hypothesis about a given event and then puts the hypothesis to the test — that is, it checks whether the prediction it has generated is correct.

Imagine a child is out to learn the concept RED TRIANGLE and approaches the problem by trying to work out whether the objects it encounters fall under this description. The child might well formulate a hypothesis such as ‘object x is a red triangle if it is both red and a triangle’ to do so. If this is the case, then the child is not really learning anything, as the model is literally ‘pre-representing’ whatever it is meant to learn to begin with; the concepts RED and TRIANGLE are literally being used in the formulation of the hypothesis, and this would mean the organism has the required concepts already. It just needs to put them together in the right circumstances. Fodor could only conclude that such an organism can represent the relevant relations before any learning!

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Linguists have also been prone to such nativist exuberance, but in most cases they have been justified in holding such views and moreover they have put forward proposals to explain the linguistic paradoxes, not explain them away or simply ignore them. A family of proposals to do just that have come to be called bootstrapping theories of learning. The use of the word ‘bootstrapping’ is apparently related to the expression ‘to pull oneself by one’s bootstraps’, but those who typically use it do so with no apparent hint of irony, considering that the original expression refers to an impossible task (Fodor must have liked this).

In the context of cognitive science, bootstrapping refers to the ‘outside help’ an organism can use to learn specific types of information. In the case of language acquisition, children are said to be able to use semantic information in order to learn certain syntactic aspects of their language. Children might for instance recognise that certain events consist of agents and actions and infer from these roles several syntactic categories such as subjects (agents) and verbs (actions). In this case, children would be learning syntactic information by bootstrapping from the semantic knowledge they already have. Though such a story assumes a fair amount of innate knowledge in the form of semantic information, not all linguistic knowledge must be – at least some syntactic information is genuinely being learned. Could a bootstrapping model circumvent Fodor’s paradox, or worse, solve it?

Many have been tempted by this possibility. After all, if learning doesn’t actually consist in forming and testing hypotheses but it’s something else altogether, then Fodor’s paradox mightn’t apply. Or so many academics seem to believe. But holding such view would be a grave error. The hypothesis model certainly brings Fodor’s paradox to the fore, but the logic of the puzzle doesn’t in fact follow from the model itself. The crux of the paradox is the impossibility of putting together complex thoughts with tools that are clearly not sophisticated enough to do so. No more, no less. Hypotheses be damned!

The case of truncated English would be appear to be clear enough. If English didn’t have the word every or a synonymous expression in its vocabulary, it would have no way to express the thoughts the word every can indeed express. And if the language of thought didn’t have the means to explicitly represent the thoughts that the concept EVERY entertains, then we wouldn’t be able to acquire or understand the meaning behind the word every. Words, after all, don’t wear their meanings on their sleeves. The force of Fodor’s argument really doesn’t rest with hypothesis testing per se, and it is telling that conscious attempts to solve the puzzle, meagre as they are in the field, all tend to fall prey to the same sort of worries.

Here’s one relevant example. The Harvard psychologist Susan Carey has of recent proposed a bootstrapping model that among other things purports to explain the transition children make from the crude form of counting to the more sophisticated method I described earlier on. She has put together a rather intricate proposal combining the different sources of information children and adults have about natural numbers and how these become interlinked during the acquisition of one’s native language. I cannot do her proposal justice here and I’m simplifying a great deal (Fodor’s typical C minus in accuracy is always a good target), but suffice to say that the criticisms she has received have centred on a familiar problem: the theory seems to assume the very information that is supposed to be learned. In the case at hand, learning to count number series (1, 2, 3, etc.) can only yield the concept of cardinality as well as other sources of information, like the fact that the set of natural numbers is infinite, if children already know that adding 1 to any number results in a new number – what mathematicians call the successor function. This very important and central piece of knowledge is certainly not bootstrapped from anywhere in Carey’s learning model, and yet it must be explicitly represented beforehand if we are to make sense of the data, bringing us back to Fodorian territory. We can sleep easy; or rather, we can’t, and that’s the point!
Fodor wouldn’t mind, for ever the good-natured fellow. I met him a couple of times, and he certainly left his mark. The first time was at Rutgers University, where I was spending three months as a visiting PhD student. I had written a short article about recursion and the study of cognition and was keen to discuss it with anyone who might listen. Fodor was (almost) the only one to agree to meet up with such a lowly doctoral student, even after I had inadvertently stood him up on our first meeting (his mistake, though). When we did meet he bought me salad for lunch and trashed my article, but I learned a great deal from the experience. The second time of note involved eating a type of food that required wearing a bib. I sat next to him during this meal and we spoke almost exclusively about literature. For some reason I was under the impression that he was quite partial to both Beckett’s theatre and 19th century English literature, and I thought this was an opportunity to leave my mark (though it meant plagiarising someone I knew, but this has never stopped a student before).

The early novels of Beckett are worth reading, I intoned, but the later playwright Beckett was too obsessed with silence and the problem with silence is that it is bloody boring. Fodor wasn’t moved and seemed more interested in an anecdote of Beckett’s I had told him earlier involving cricket, a day of good weather in London and being alive. We later moved on to 19th century English authors. The problem with them, I intoned again, is that they were more interested in being philosophers than writers, and moral philosophers at that! I don’t think he quite heard it. But I’m sure he would have appreciated the effort. Or so it seems to me here at St Thomas’ Hospital.

London 2017
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