LANGUAGE, CULTURE AND MIND: INDEPENDENCE OR INTERDEPENDENCE?

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Introduction:
Cognitive Science and the Market of the Mind

I start by displaying a detail from a painting by Veronese, an Italian Renaissance painter. This painting has different titles if you look for it on the internet, but one of the titles is *The Dialectic,* and the detail that you see here represents one way of trying to depict the human understanding of the network of meaning within which we all live, and the way that as scientists and scholars we reflect upon language and meaning as a kind of web, which binds us together with each other, with other human beings, and a web which we can examine in order to foster our own cognitive creativity.

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The question that I ask in the title of this lecture, whether language, culture and mind are independent and autonomous from one another, or whether they are mutually interdependent, is one that continues to provoke deep divisions in cognitive science. Cognitive science is the interdisciplinary study of the mind. The disciplines involved in contemporary cognitive science are Psychology, Linguistics, Artificial Intelligence, Philosophy, Anthropology, and Neuroscience (which is increasingly important, and is itself an interdisciplinary enterprise comprising different sciences of the brain).

The term cognitive science started to be widely used in the late 1960s and 1970s, and the term was at that time synonymous with a particular picture of the mind, influenced by computer science and by Noam Chomsky's generative linguistics, that saw the mind as a computational system, or an aggregate of different, specialised computational devices or modules. In the last decade or so, this Computational and Representational Mind of Classical Cognitive Science has been confronted with a host of new competitors, in what has become a teeming intellectual market place of the mind. The Computational and Representational Mind is no longer, as the philosopher Jerry Fodor once famously put it, "the only game in town". It now shares the field with the Embodied Mind, the Extended and Distributed Mind, the Discursive and Dialogic Mind, and the Shared (or Intersubjective) Mind. How can we make sense of this creature of many faces, that we call the mind?

The Classical Cognitivist mind is *The Computational & Representational Mind*, as represented by theorists such as Fodor, Johnson-Laird, and Jackendoff. *The Embodied Mind* is represented by Varela, Thompson & Rosch; and Lakoff & Johnson. *The Extended & Distributed Mind,* about which I will say more later, is represented by philosophers such as Merleau-Ponty, psychologists in the Vygotskian tradition, contemporary philosophers like Andy Clark, and cognitive anthropologists such as Edwin Hutchins. *The Discursive and Dialogic Mind*, in the tradition of the Russian linguistic and literature theorist Bakhtin, is represented by psychologists such as Rom Harré, Ivana Marková, and James Wertsch. Finally, for now, *The Shared (or Intersubjective) Mind* is represented

by the philosophical tradition of phenomenology based on Husserl, the philosophy of the later Wittgenstein and psychologists such as Colwyn Trevarthen.

Let us spend a little more time on the notion of *The Extended & Distributed Mind.* The idea here is that the embodiment of mind extends beyond the organismic boundaries of the single human individual, to encompass both cultural artefacts and socially organised collectives. One term to use for this, logically enough, is *extended embodiment.* One of my favourite psychologists, Jerome Bruner, as long ago as 1966, was one of the first people in cognitive science to take the idea of cultural situatedness seriously. He wrote: "[It] is always difficult for the psychologist to think of anything 'existing' in a culture. We are, alas, wedded to the idea that human reality exists within the limited boundary of the human skin!" Bruner directed that criticism against the psychologists, but it could equally well be directed against many linguists and philosophers.

Three Fundamental Philosophies of Mind

Let's try to simplify this picture by examining what we might call three fundamental philosophies of mind, not just of language. The first fundamental philosophy of mind is of very ancient provenance, going all the way back to Plato. That is the notion that mind is autonomous, and exists in its own purely mental realm, a realm inhabited by pure Forms and by Ideas. Versions of this formalist and idealist philosophy of mind have been advanced by philosophers such as Descartes and Frege.

The second point of view, we can say, is an essentially materialist view of mind, which views it as being "in the brain". Mind, however mysteriously, is an aspect of matter, and a property of the brain and the embodied nervous system. We can find precursors of this view going back to philosophers such as Spinoza. It was certainly Darwin's view. It was also the view of the great 19th century psychophysiologist Helmholtz, of the founder of experimental psychology, Wilhelm Wundt, and of course of many others.

There is also a third notion of mind, which is not necessarily in contradiction to the second one. This is that mind is in society, that mind is essentially intersubjective and social. It is this view that I have referred to above as the Shared Mind. We can find this view expressed by philosophers ranging from the 17th century Italian philosopher Vico, through Karl Marx, to the later Wittgenstein.

Few scientists nowadays, perhaps none, would deny the truth of the claim that the mind, and mental processes, are in some way united with the brain and the nervous system. Even Descartes acknowledged that the realm of the mental, the thinking self or *Cogito*, needed to hook up in some way with the brain as an organ of the body, even though his philosophy preserved the autonomy of the mental. Yet the precise nature of the One-ness of mind and brain continues to mystify philosophers and to fundamentally divide opinions in cognitive science.

If we accept that mind and brain are in some way indivisible, there are, I would say, only two possible ways in which we can understand this unity. The first way, more or less following Descartes, is to ground the Autonomous, Ideal and Formal mind in the brain, defining the object of study as the Mind/Brain. The formal aspect of this object of study is provided by the full specification of the Computational and Representational system, and its material aspect is provided by the brain as a physical device implementing this computational system: the Mind/Brain is a Physical Symbol System; the brain is the hardware (or "wetware"), and the mind is the software. This is the viewpoint that we can call Classical Cognitivism.

It seems to me that a serious problem arises when you try to combine ideas which are taken from the first of these views with ideas which are taken from the second of these views, ending up with a philosophical construct called "the Mind/Brain", as if these two completely different philosophical positions can actually be combined and reconciled by dint of the typographical device of just calling it "the Mind/Brain". This is a fundamental problem, I think, with many discussions in cognitive science of the nature of the mind—that they try to bring together concepts stemming from essentially irreconcilable philosophies of mind.

The alternative route to the unification of mind and brain is to ground the *social mind* in both the brain and the intersubjective and cultural surround, and to emphasize that *mind* extends beyond the body and brain of the individual, involving the co-ordination of interacting minds (the Distributed Mind), and the symbolic and material tools for thought at hand in the situation (the Situated and Extended Mind).

I'm going to suggest to you that cognitive science is now the site of contestation between two paradigms. These two paradigms are the Classical Cognitivist paradigm and the new paradigm. The classical paradigm is often called "rules and symbols

cognitivism". And the new paradigm is a rather more diverse one, not so easily encapsulated. But I have given it a name: *situated, embodied, enactive cognition*. The first difference I want to emphasize between these paradigms is that the classical cognitivist paradigm is formal and very much inspired by the formalist approach in linguistics, whereas the situated, embodied, enactive cognition, which I will henceforth call the new paradigm, is much more functional in its approach.

While the classical paradigm is nativist, the new paradigm is based on epigenetic-developmental principles – dynamic principles in development. While the classical paradigm is modular, emphasising separate processes for different domains of cognition, the new paradigm emphasises general principles of learning and organisation and dynamism. Whereas the classical paradigm is determinedly Universalist, the new paradigm recognizes the importance of context and of particularity. Whereas the classical paradigm is monologic, situating its theories in the mind of individual speaker-hearers without much concern for the process of communication, the new paradigm is interactional and dialogic.

Whereas the old paradigm is very much based upon linguistic theory, and in particular formalist linguistics, and is logocentric in the sense that it is orientated toward word-like symbols, the new paradigm is multi-modal, emphasizing that communication is a matter of many media and of the whole body. Whereas the classical paradigm is based upon methodological individualism, in which it is the individual Cartesian Mind/Brain which is the focus of attention, the situated, embodied paradigm focuses on the culturally extended and socially distributed mind. Whereas the classical paradigm looks at the disembodied mind, the new paradigm is based upon the notion of the embodied mind. And finally, because computational theories are an important part of cognitive science, we have to look at the different theories of computation which currently fall into at least two paradigms. The classical paradigm, as many of you know, is based upon an algorithmic view of the manipulation of internal symbols analogously to a computer program based on a von Neumann serial processing architecture, whereas the new paradigm is very much inspired by connectionist neural network models of human cognition.

Defining Language, Culture and Mind
Formalism and Functionalism in Theories of Language

In talking about the relationships between language, culture and mind, we need to know what we are talking about. We need to define our terms. Let's start with language. Here I distinguish between two broad approaches to language, communication and the learning of language: Formalism and Functionalism.

For Formalism, Language is a formal system of rules and symbols. Communication is about the transmission of ideas from one individual head to another individual. And Learning is the internalisation of the system of rules and symbols on the basis of linguistic input. Whereas, for Functionalism, Language is a semiotic vehicle and a cognitive and communicative tool. Communication is symbolic action in an intersubjective field. And Learning is situated, embodied and socially scaffolded.

Formalist theories emphasize the autonomy of syntax from meaning, as you know, and they view semantics as only trivially culturally variable. For Formalist theories, language is *autonomous* from culture. It doesn't really have anything to do with culture. In contrast, functionalist theories recognize universal motivations, universal functional motivations of linguistic structure, but they view language as a *part of* symbolic culture.

For formalist approaches, in particular the approach of the early Chomsky, language is defined as an infinite set of sentences. More generally, language is conceived as a rule-governed system of symbols, possessing the features as follows.

Productivity, which means in this paradigm the combinatorial rules enabling the generation or construction of novel legal sentences, or of an infinite set of legal sentences; so this is the set of rules which underline the infinite set of legal sentences. *Systematicity*, which means within this paradigm the stability of symbolic value across lawful combinations. For example, we could take the two sentences: *The lectures are in Beijing* and *The lectures in Beijing take place in December*. And we have to assume that each identical symbol entering into these two different sentential strings has the same value across both sentences. Otherwise we will not be able to have a productive system in which meanings are stable across the combinations. For Formalism, the issue of the stability of meaning is a problem. Why? Because Formalist theories are syntax-driven—the rules determine the possible forms of legal combinations.

For a formal description of language to "hook up" with the world—to be Grounded in the world—a semantics is required that maps sentences in the language to objective states of affairs in the world, which is why Lakoff and others talk about the Objectivist commitment of formalist linguistics. And this referential relationship has to be determinate, in other words, there must be a clear and unequivocal relationship between the sentence strings and "states of affairs" in the world, and the way this is usually secured is by invoking the notion of truth as correspondence. And this leads to the hypothesis – or really it is not a hypothesis. I think for classical cognitivism, we can say it is an *axiom* that the mind is to be considered as "a *syntactically*-driven machine whose state transitions satisfy *semantical* criteria of coherence". That is from the archpriest of Classical Cognitivism, Jerry Fodor, and his colleague Zenon Pylyshyn. Therefore formalist theories require strict compositionality to account for systematicity: the meanings of legal combinations are built up from the meanings of their constituents. But there is a problem, for which Formalism doesn't have a solution. In point of fact, natural language expressions are difficult to characterise in terms of strict compositionality.

Let's take those same two sentences, they seem to be pretty OK to begin with, but if we examine them more closely, and we just highlight that little word *in*, in the two sentences:

The lecture is <u>in</u> Belo Horizonte.

The lecture <u>in</u> Belo Horizonte takes place <u>in</u> August.

It becomes clear that for the three usages of "in", of the three usages, there seem to be two different meanings of the word "in", one referring to location, and the other referring to time. And that is why Formalist theories of language prefer to posit *general* meanings, very general abstract meanings, instead of recognizing the polysemy or "many meaningfulness", of many natural language items, whereas the recognition of polysemy is historically central to Cognitive Linguistics.

Now let us step up one level of abstraction, away from the meanings of natural language, to the meanings which have to be entertained in the Classical theory by this hypothetical syntactically-driven machine in its entirety. The general solution posited by classical cognitivism to the problem of meaning is the idea of a computational *Language of Thought,* which was first proposed by Jerry Fodor. The *Language of Thought* is not a natural language. It is meant to be a universal language in which the thoughts of

all human beings are internally represented. Natural language expressions are derived by some kinds of translation mechanism from this *Language of Thought*, and the *Language of Thought* is completely unequivocal, monologic and univocal: it doesn't have polysemy, ambiguity and all of the rest of the messy stuff of natural language. The amazing thing about the classical cognitivist program is that, from the start, it takes us further and further away from the real world of language, as people actually use it, towards some kind of idealised mechanistic system, existing in a strange formal universe, a bleached-out and unfleshed universe of pure form.

In any case, for Classical Cognitivism this *Language of Thought* is what anchors natural languages in the form of "knowledge of language", or as Chomsky calls it, internal language or I-language. For Chomsky, it is the internal language which is primary, which takes precedence over, the empirically real language which is out there in the world, the language which you and I used to communicate with each other.

Now let us contrast this with Cognitive-Functional Linguistics, for which languages are conventional symbol systems enabling *communication, conceptualisation and construal*. These are the three Cs of Cognitive Linguistics (or four Cs if you count Cognitive). Cognitive Linguistics is about communication, conceptualisation, and construal. Languages, you will perhaps recognize this from the work of Langacker, are open inventories of symbolic assemblies at different levels of organisation. That's our alternative in Cognitive Linguistics for the formalist idea of an infinite set of sentences. In place of that, we have for any language an open inventory of symbolic assemblies, but not one which is generated by some kind of mechanistic productivity process.

Finally, languages are multilevel systems of *mapping* between linguistic conceptualization and linguistic expression. And this notion of a multilevel system of mapping is taken further in the work of well-known cognitive linguists such as Fauconnier, Lakoff, Langacker, Talmy and others.

Language as a Tool for Thought

Language as a tool is a fundamental idea in all varieties of Functionalism. Language is a tool whose form or structure is shaped by its use for communication. This is an idea which we find in the Prague School Linguistics of Roman Jakobson, Mukaróvsky and others. We also find that in the theories of the great psychologist of language Karl Bühler, who developed what he called the Organon model of language and communication, Organon being the Ancient Greek word for tool. And we also find it in later functionalist linguistic theories such as those of Simon Dik, Michael Halliday and Talmy Givón. However, language is not only a communicative tool—language is also a *tool for thought*, which shapes cognition. And this is the notion of *semiotic mediation*, of cognition through signs and sign systems.

This idea, that human higher cognitive processes use the tool of language and signification to transform learning, memory and all cognitive, all higher cognitive processes, we can find in the Western tradition back in the French Enlightenment with philosopher Condillac. Most famously, in Psychology, the concept of semiotic mediation gets taken up by the Russian psychologist Vygotsky; and the idea that this semiotic mediation in some kind of way shapes our cognitive processes, giving them form, we find also in the work of the American linguists Whorf and Sapir.

Language as a Social Institution

So far we have looked at language as a system and we have looked at language as a tool, but there is more: language is also a social institution. It is part of, if you like, the social mind, because grammars are normative and conventional, and normativity and conventionality are hallmarks of human social institutions. There are rules for what you should do, and what you shouldn't do, there are right and wrong ways of going about things.

Before we move on from this, let me note something else. For Structuralism, in tradition of Saussure, the notion of conventionality gets confused, I would say, with the notion of arbitrariness. The point is that not all conventions are arbitrary; some of them are *motivated*. And one of the great virtues of cognitive-functional linguistics is to

point out that many phenomena in language, while being conventional, are nonetheless motivated by deep cognitive and communicative processes. In other words, there is a reason for why apart of language is this way rather than that way, and this is part of more general functional perspective within Cognitive Linguistics.

Now I return to the question of normativity. *Norms* are intersubjectively shared rules that regulate conduct and are objects of common knowledge. In other words, the rules of language or any other normative systems are the rules we follow when we do things. They regulate conduct, but also they are rules to which we orientate in trying to understand another. They are objects of common knowledge, shared intersubjectively between people. And if that is the case, please note that knowledge of language is not identical to language (*contra* Chomsky—against Chomsky' claim). The importance of this has been stressed many times by my friend and colleague, a linguist from Finland, EsaItkonen. Chomsky's claim is that language is knowledge of language. My response (and Itkonen's) is that there is language on the one hand, and there is knowledge of language on the other hand. Because if we recognize that knowledge is social institution, we cannot say that the institution is the same as the knowledge of the institution. They are two different things. Think of it in this way, there are the rules of football. In order to play football correctly, you have to know those rules; that is indisputable. But there is football played under the rules of football, and then there is socially shared knowledge of the rules of football, they are not at all identical.

Of course, football would not exist if nobody used its rules, but these rules exist in some way independently of their particular individual representation by any given person. Knowledge may vary on an interindividual basis. Again take football, imagine a small kid comes in and joins in a game which bigger kids are playing. The bigger kids know

more of the rules than the smaller kid. But when he starts to play, the smaller kid is nonetheless playing football. He is joining in not just any old game, but the game of football. Think about that as a metaphor for language acquisition.

Rules are shared between people, and that is where something else important comes in, which is Wittgenstein's argument against the possibility of a private language. Wittgenstein said that it is not possible for somebody to just invent a private

language which only they know, because how would they know, if they try to remember the rules of that language, how would they know whether they would be right or wrong? There would be nobody else around to correct them. That is the way Wittgenstein argues it, but anyway, the point is that I am using this argument to show that once we acknowledge that language is social institution, the Chomskian fiction that knowledge of language is the same as language itself and the internal language is the primary language can be shown to be logically and methodologically completely misguided; and the same applies to its supposed foundation in a universal Language of Thought.

Language as a Biocultural Niche

Language is also a biosemiotic system and an ecological niche. First of all, language is a biologically grounded communication system. Now,there are many biologically grounded communication systems because in the natural world, the animal world, there are many ways of communicating, and many systems for doing so. All of them are of course biologically grounded in the sense they are grounded in organism, in evolution and in biological function. And language is no different; language did not, as it were, descend from the sky to replace other biologically grounded communication systems. It emerges somehow out of nonlinguistic or prelinguistic biologically grounded communication systems. Language is a very special sort of communication system because it is a system of communicative science that can be analysed from the perspective of biosemiotics. As you probably know, Semiotics is the study of signs and sign functions. As a matter of fact, the specific characteristics of human natural language derive from the nature of the sign function which is instantiated in natural language.

Thirdly, language is a species-unique ecological niche that is absolutely fundamental to human *culture*. Culture is not necessarily something that only humans have – but the kind of culture that we have is a culture which is dependent on language for its transmission, for its day-to-day living, for its enactment. That is unique to humans and it is our niche. All species exist in some kind of ecological niche, a system of constraints and supports that enable actions. We are no different, but what is interesting

and important about human beings is that language is a constitutive, essential part of our human cultural niche. So language, I will submit to you, can be viewed as a bio-cultural niche. And the title of one of the later lectures in the series is "language as a biocultural niche and social institution", in which we are trying to understand how it is we can articulate those points of view convincingly.

Culture in Psychology and Linguistics

So much for now for language, what about culture? What is culture? One thing we can say about culture is that something shared by one group but not another group. It is about specificity and it is about difference. For example, I can talk about British culture, and I can talk about Brazilian culture, and there wouldn't be any point in talking about these two cultures on that level of analysis if there were no interesting differences between British and Brazilian culture. Or I can step up to another more abstract level of analysis in the way I just was doing. And I can talk about human culture, in which case, I am probably contrasting it to some other culture of some other species. In any case, culture is always about sharing, and it is always about difference, which is what makes it so intriguing, and of course, one of the aspects of difference is that this difference can be viewed both positively and negatively.

So what is it that is actually shared by one group that we call a cultural group? There are different answers to this question. One way to think about this is that it is ways of doing things, different kinds of practices, practices which may be to do with communication, or maybe to do with making things, or anything under the sun, practices. But it is also to do with ways of thinking, mental models, schemas, and worldviews.

Culture (at least human culture) is also ways of talking, discourses. The ways in which we talk about things are significant to us. Now to me, it's not important to say that one or other of the definitions, ways of doing things, ways of thinking and ways of talking, is *the* correct way of defining culture. In fact, they are all correct ways of defining culture. They are all part of the package that we call culture, they are different aspects of it. Moreover, we can also say there is another level of analysis; we can talk about "High" and "Low" cultures, subcultures and so on. There is no final end to the granularity at which we may analyse culture. Cultures can be microcultures, we can

talk about the cultures of organisations, for example, we can talk about the culture of the Federal University of Minas Gerais. Or we can talk about the particular culture of a profession or a working group, or a sports club, you name it. That's why in recent years, anthropologists who study culture have become very interested in such local and specific forms of culture.

Let us ask now: what is the cultural approach within Psychology? It includes, but is not identical with, cross-cultural psychology as a method. It focuses on what the cultural psychologist JaanValsiner calls "the systemic and dynamic nature of culture in psychology, and psychology in culture". It is about the semiotic mediation of higher cognitive processes and it is about culturally situated learning and cognition. And very frequently, cultural psychology makes use of the cultural-historical-developmental perspective derived from Vygotsky, who was the main founder of Cultural-Historical Psychology.

What about Cultural Linguistics? We can go back here to the great American, originally German, anthropologist and linguist Franz Boas, who stated: "the purely linguistic inquiry [in other words, just looking at language] is part and parcel of the thorough investigation of the psychology of the peoples of the world". By the way, the plural here, "peoples", is very important. Boas believed that Psychology must investigate both similarities and differences between peoples with different cultures and languages. And he probably took this idea from one of the founding fathers of the Psychology discipline, Wilhelm Wundt, who is usually credited in history books for founding the first psychological laboratory in Leipzig, Germany, in the 1870's, but who devoted much of his life to writing about what we now call Cultural Psychology, that is the comparative psychology of peoples.

Bringing us more up to date, we have another quote: "Cultural linguistics is concerned with most of the same domains of language and culture as Boasians [that is, as linguists who follow Boas] in the first part of the last century. It assumes a perspective which is essentially cognitive". This is a quote from Gary Palmer, who is a cognitive linguist and cultural linguist. He also says: "Linguistic meaning is subsumed within world view", by which term, "world view", he means the entire assembly of cultural schemas and meanings specific for that culture. What Palmer says is very important. He is saying that linguistic meanings are only part of the meanings by which we live,

as it were. And Linguistics, like Psychology, needs to be situated in cultural context. Palmer is a real pioneer of the cognitive linguistic study of culture.

A Case Study: the Conceptual Mapping of Space and Motion to Time

Cognitive linguists have proposed that there is a universal tendency, and perhaps a universal realisation of that tendency, across languages, to map spatial motion to temporal motion, to employ a metaphoric or analogical mapping between the conceptual domains of space and time. We can cite much linguistic evidences to support this hypothesis.

The recruitment of locative words and constructions to express temporal relationships in language is widespread. I will give examples below. These examples are from English but they are typical of Indo-European languages. And one of the things that I would like to ask you to do as we go through this lecture, in common with some of the other lectures, is to reflect a little bit about your language and culture, and to see how what I say fits with your experience of your language.

In English, for example, we say *the weekend is coming,* using a basic motion verb, *to come*. We can say *the summer has gone by*. We can say *he worked through the night,* using a prepositional phrase. We can say *the party is on Friday,* again using a propositional phrase. We can say *he is coming up to retirement,* again using a motion construction, or we can say *I am going to get up early tomorrow,* using the "gonna" construction, which can be found in very many languages.

Now the question I want to ask is: is this universal? Some people have claimed it is. Their claim rests on various reasons, including the assumption that there is a kind of natural analogy between space and time, and it has also been claimed that some aspects of neurological structure motivate this universal. Well, it is true that the recruitment of spatial lexical and grammatical resources for conceptualising time is very widespread. So much has been established. However, research into space-time analogies in language has only investigated a limited example of languages and cultures. And this is a problem, because in such research, time is presupposed to be a distinct

cognitive, and hence also linguistic domain in all languages and cultures. The idea is that all languages and cultures have this domain called Time. And I call this notion of time as a kind of abstraction, the notion of Time-As-Such.

Of course, Time-As-Such is a concept which can be lexicalised in words like "time". But I mean more than that. I mean the idea that there is a conceptual domain called Time, within which events occur. And I want to question whether this concept is universal. The other question that I think has never been properly posed is whether space-time analogies are a fact of language, or of cognition, or of culture? Is it primarily a cognitive phenomenon which is due, for example, to structure and processes in the human brain; or is it a cultural phenomenon, or is it somehow both of these?

Now, at this point, I want to introduce you to the notion of **cognitive artefacts**. The notion of a cognitive artefact owes a lot to Vygotskian Cultural-Historical Psychology. Cognitive artefacts can be defined as those artefacts which support conceptual and symbolic processes in specific meaning domains. Of course, all artefacts are cognitive in some general way, because they are products of cognition as well as physical practice. A cup, for example, is a relatively simple artefact, which instantiates the concept of containment. And it is *intentionally* produced to fulfil the function of containment. But when I use the term *cognitive* artefact, I am talking about a very specific subclass of artefacts, which enable us to carry out reasoning processes, or symbolically support reasoning processes in specific meaning domains.

Here are some examples: notational systems such as writing systems or number systems; dials such as the dials you will find in a car or instrumentation dials on machines for reading out, I don't know, tyre pressures or anything like that. Calendars are cognitive artefacts, and I will be paying particular attention to calendars; or compasses, for example, are also cognitive artefacts, a Chinese invention actually.

And the point about such cognitive artefacts is they enable people to do things in a way which they would not be able to do without such artefacts. They actually are transformative of human cognitive power.

Now another thing is that the cultural and cognitive schemas organising, for example, time can be considered as *dependent on*, and not just expressed by, cognitive artefacts. So what I'm trying to say is that complex number systems, standardised number systems, depend on having number *notations*. That is, it is not the case that

the number notation just expresses a concept of number which exists independently of that notation. Rather, the notation *makes possible* the number concept.

Furthermore, if you think of time as it is expressed in a calendar for example, let's take a cyclic notion such as the days of the week, such as when we give names to the days of the week as in English: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday; and we embed these into a calendric system. What exactly are we doing? Are we taking concepts which already existed independently of that notation and independent of that organisation into a calendric system? No, we are not. We could not even *think* of the days of the week without naming them, and without having some kind of cognitive artefact for representing that schema. Cognitive artefacts can be extremely complex. In the case of the cognitive artefacts which support human cognition in the temporal domain, they often are. They also have a history. They did not come into being all at once. They are part of human cognitive history, if you like. So the question I want to ask concerns the notion of "Time-as-Such" – a particular idea of what I also call "reified time", the notion of time as somehow independent of the flow of events that actually really constitutes phenomenological time for humans. The question is whether this concept of Time-as-Such also has a history, whether we should look upon it as a concept that is not natural but culturally constructed.

And here I want to come back to the notion that I have introduced to you in earlier lectures, of what I called *extended embodiment*. Many of you know that Cognitive Linguistics is an approach in Linguistics which emphasizes the importance of embodiment, and in particular the human body as a privileged source domain for thinking about abstract conceptual domains. But in my view, embodiment does not stop with the corporeal human body. The embodiment of human cognition goes *beyond* the human body to incorporate artefacts, and amongst them, cognitive artefacts. Cognitive artefacts are part of extended embodiment, the extended embodiment by which we project around ourselves a shared cultural and cognitive world.

Here [Powerpoint slide] is an example of a cognitive artefact in the domain which we are talking about today, which is time. This is a medieval clock, a medieval clock which is still to be seen in the Cathedral in the Swedish city of Lund. Such medieval clocks can be found in many ancient cities of Western Northern Europe and Central Northern Europe as well. Let me bring to your attention the complexity of this artefact.

Up here, you have a clock face: as a matter of fact, it is a 24-hour clock face. Here you have a little automaton, and once a day, at three o'clock in the afternoon, these little guys come out and they circulate around here while the clock rings a chime.

This clock face displays years, and around the rim you will see the signs of the zodiac. So this tells us something about the complexity of cognitive artefacts, and something that is amazingly striking is that, for example, monthly, yearly and hourly time interval systems are represented here cyclically, by a circle. Now that cyclical schematisation of time, involving a kind of circle or wheel, emerged simultaneously with the emerging mechanical clock. Early mechanical clocks, whether these were Chinese water clocks or early European medieval clocks, did not have a face. They didn't have this cyclical schema, actually they just used sound. The whole point of the early clocks in medieval Europe was to regulate labor in the field, it was only later the notion of the clock face was invented, so you see that these schemas, and the cognitive artefacts that organise them are historically emergent.

Calendric systems too, I am going to suggest you, can be considered as instruments or artefacts which divide the "substance" of this rather fictional notion of Time-As-Such into quantitative units. Calendric systems have a recursive structure in which different time interval units are embedded within each other. And calendar systems are cyclic and, very importantly, they depend upon numeric systems. If we don't have numbers for counting time intervals, you can't have a calendar. OK, all of this was a sort of preamble.

Now I'm going to tell you a little bit about the community with whom we did our field research in the language and cultural conceptualisation of space and time, the Amondawa. The Amondawa are an indigenous group of about 115 people, a very small community living in the State of Rondônia in Greater Amazonia, Brazil. The first official contact between this group and the outside world was in 1986. The language they speak is a Tupi Kawahib language, which is a subbranch of the Tupi language family, which is the largest language family of South America. Tupi languages have actually been described in the ethnographical linguistic literature for centuries, ever since the Portuguese went to Brazil. The Amondawa language has been described, and ethnography has been conducted, for more than 10 years. All the speakers are bilingual in Amondawa and Portuguese except the 2 oldest people. By "bilingual" I don't

necessarily mean they are bilingual in the sense that they have an equivalent competence in two languages; I just mean that most people speak two languages in the sense that they are able to communicate in both of them. There is a school in the village in which the language of instruction is Amondawa.

The Amondawa Grammar and Lexicon of Time

The first thing to be said is that there is no abstract word in Amondawa meaning "time". It's not the only language about which that has been observed. In general, the languages about which that have been observed are usually languages of nontechnologically advanced cultures. Secondly, past and future are not expressed in verbal morphology. There is no verbal tense system. Well, that's not so unusual: Mandarin Chinese, for example, has no verbal tense system, either. And there are many other languages which do not have a verbal tense system.

There is, however, a complex nominal aspect system – and what does that mean? We are used to the idea that temporal aspect is expressed on the verb. What does nominal aspect look like? Well, it just means that things like futurity, or already having happened, are expressed on nouns. And you could say it would be a little like English expressions such as "ex-wife", or "my house-to-be", or something like that. So aspect is marked on the noun.

There are only four numerals in Amondawa. Some people find it difficult to believe this, they often think this is just one of those tall stories when we speak about languages which don't have complex number systems. But there are languages known to only have 2 numbers. Amondawa has 4. There are no cardinal chronologies, in which are expressed things like ages of individuals, and there are no ordinal chronologies, such as yearly or monthly calendars. So here [slide] is the Amondawa number system. 'One' is this term "pe´i"; two is this term "monkõi"; three is expressed alternatively either by "monkõiape´i" or "ape´imonkõi", which are both combinatorials of one and two.
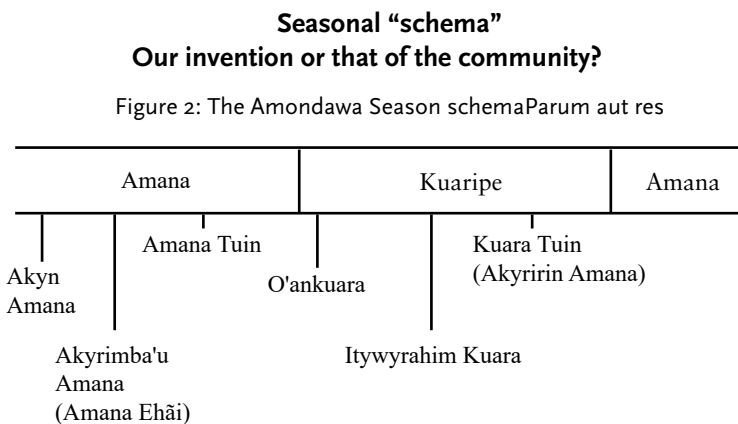
The Amondawa Seasonal Naming System

Now, I said that Amondawa doesn't have a calendric system, so what do they have? Do they have any way of talking about the passage of time on, as it were, a large scale, involving changes in the ecology and vegetation brought out by movement of the earth around the sun, and so on?

The answer is yes, they have a system of naming of seasons. There are two seasons: the first season is the dry season and it is called *Kuaripe*, which is derived from the noun "Kuara" which means "sun" and the postposition "pe" which means "in". So that's the dry season, and this season has 3 subdivisions, which more or less correspond to the beginning, the middle and the end of the dry season. And there is another season, predictably enough the rainy season, which is just called "Amana", which is the word for rain. And this also has 3 subdivisions corresponding to the beginning, the middle and the end of the rainy season.

These seasons mark changes in the weather, and they are also correlated with planting, because Amondawa is a small scale agricultural society; and has been for a long time. They do hunt, and they do fish, and they do gather in the forest but you can't call them a hunting-gathering society, because they do cultivate crops as well and that's a traditional practice. And in fact, linguistic reconstructions of proto-Tupi suggest that the time depth for naming agriculture activities and implements goes back around about 2000 years.

So we can represent the seasonal schema of the Amondawa something like this:

Seasonal "schema"
Our invention or that of the community?

Figure 2: The Amondawa Season schemaParum aut res

Amana	Kuaripe	Amana

Akyn Amana	Amana Tuin	O'ankuara	Kuara Tuin (Akyririn Amana)

Akyrimba'u Amana (Amana Ehãi)   Itywyrahim Kuara

Amana, Kuaripe, Amana. One succeeding the other. Is that the way the Amondawa themselves think about it, or is this schematic representation our invention as external analysts of their culture and community? We tried to answer that question. We tried to answer it by doing an investigation, as best as we could, of how the Amondawa people themselves think about the seasonal schema. What we did was we gave the consultant paper plates, and we asked them to place these plates in such a way that each plate represents one of the subdivisions of the rainy and dry seasons. He just put one after the other, using his right hand, starting on the right and going over to the left and then going back again. What he did was he did it in such a way that was easiest for him to physically accomplish. The final shape is a function of the distance between his shoulder and where he placed these paper plates. He didn't make any attempt to make a circular schema, and he didn't try to make it a straight line, either. Although it was linear, he sort of doubles back on himself, so that there was no necessarily left-right or right-left canonical order to this. It was really basically just sequential, and linear, though not rectilinear.

What about the day? In our familiar culture, we segment times of day by clock time, by hours, minutes, and even seconds. For Amondawa, the day is divided into the morning, the afternoon and the night. It is also further divided by customary activities such as the times of waking, working, eating, resting and sleeping, each of which has got a name, and names that time of day. And night, of course, is marked by the disappearance of the sun, and darkness. This lexical item for "night" also has the meaning "black". The interval systems of season and day have subintervals, but there is no superordinate year. There is no word in Amondawa for a unit comprising the dry season plus the wet season. There is no year. There is no name for the week or for the lunar month. They are aware of, and are able to name, and do name the phases of the moon in terms of what the moon looks like, but they don't seem to use that to mark time intervals. There is one application, we think, of the 4-item numeral systems to time intervals, which is enumerating moons, which are probably lunar phases, but we are not even sure about that. That's something we need to investigate further.

But we can really quite reliably say that there is no calendric system; whereby day units are integrated into weeks, and months, or anything like that. There are no names for days, there are no names for weeks, and no names for months; and there is no concept of "year".

The Structuring of Time by Events and Activities

In our culture, time intervals are structured by cognitive artefacts such as calendars and watches. These artefacts impose a quasistatic cultural model on the schema of Moving Time. In other words, I know, as it were, that one day succeeds another. But if I have a calendar up on my wall, I can see all of these days simultaneously, which is a kind of quasistatic cultural model of this notion we have of Moving Time. In contrast, Amondawa time is structured by events in the natural environment, and in particular seasons, and in what the anthropologist Pierre Bourdieu called the social *habitus* of activities, events, kinship and life stage status. We can diagram Amondawa time, but there is always risk of distorting it by imposing "Western" (inverted commas) cultural schemas of cyclicity and/or linearity.

Let's think a little bit about the notion of "event". By definition, I suppose, events occur in time, not just in the sense of what I have called Time-As-Such, this kind of cultural construct of time as an abstraction, but also in time as a phenomenological or experiential dimension. However, the conceptualisation of an event as occurring in a temporal plane, or in a temporal landscape, requires a schematisation of motion along a path defined by intervals. So, supposing I say something like *the salt is gone*, OK? What sort of the utterance is that? Is this an utterance about time? No, I don't think so. I'm using a verb of motion, of the kind that is often mapped onto temporal relationships, but the expression "gone" in this case has much more the meaning of absence or disappearance: that what was present now is absent.

In the same way, English-language-acquiring children will often use the expression *all gone* to signify the absence of something which was there before. Let us take another example. *The summer is gone.* Well, this looks a little bit more like a metaphorical construction, using a spatial motion verb to talk about movement in time. But maybe it is not. Maybe it is more analogous with *the salt is gone*, with the difference that it is an abstract, temporally extended object, the summer, rather than a concrete and spatially extended object, the salt, that is now absent. Another example: *next term is coming*. Here we are getting much closer, I think, to a genuine metaphorical construction of time as based on spatial motion. The point I am trying to make is that all of these expressions employ motion verbs, but I would suggest they are not all temporal expressions in the

true sense. Even *the summer is gone* is more about disappearance, or can be thought of as being more about disappearance, than as being about events in Time-As-Such.

How can we further determine how Amondawa culture and language structures time? What we did was, we conducted another informal field experiment, in which we used small objects which we designated as being seasons (the rainy season or dry season), and we used small human figures as well. And we moved these around, and we tried to get people to talk about the appearance and disappearance of seasons. What results did we get? We got expressions like this: *the sun* or *the dry season goes now,* and *the sun has crossed. The sun or dry season is coming.* This is very interesting. It means there is nothing in Amondawa language or culture that prevents people from using verbs of motion to talk about events which are not actually really physical motion events. (Admittedly, there is a methodological problem here, because we were using this small installation model in the experiment). There was physical motion of the objects, but the point is that they participants used words that denote seasons and time intervals. So there is nothing, either in the lexical and constructional inventory of space and spatial motion, or in the semantics, which prevents speakers from using motion verbs, or other locatives, together with words signifying temporal entities. The point, however, is that when we looked at what Amondawa speakers do spontaneously, they certainly have not elaborated this into any kind of system, and they don't talk about time in terms of spatial motion on a regular basis.

Amondawa people, then, are just like anybody else, in that they are able to use spatial terms to talk about temporal intervals, at least when they provoked to do so by circumstances, including the circumstance in which we actually kind of give them models, and small objects, and get them to talk about what's going on. But they don't do it as part of their everyday linguistic practices, and they don't have conceptual systems like calendars which are based on this. And they don't have terms equivalent to 'before' and 'after'. These expressions just don't exist.

We can now provisionally answer the fundamental research question: is it the case in all cultural contexts that time is conceptualised analogically with space? We think the answer is no. We think that in Amondawa, time is conceptualised in terms of events in the natural environment, or in the social habitus of activities, events and social structure, including kinship and life stage. And this could also be why time is apparently

minimally grammaticalised in Amondawa, as well as not being regularly talked about in metaphoric terms.

We are aware that there are a lot of methodological issues involved here. And the first methodological issue is that when we say we haven't found evidence of something, that doesn't necessarily mean it is not there. Absence of evidence is not evidence of absence. Fieldwork methods require long term intensive investigations. And although we have done about ten weeks of field work, extending over about five months, it is not enough. And there are certainly gaps in our data, and perhaps systematicities we have not noticed and analysed.

The second methodological issue, of which we were not really aware when we started this research, is the way in which concepts of time in Amondawa culture, just as in our culture, are bound up with social norms and conventions. For example: here is a little abstract from an interview with one of our consultants. In this interview, the researcher (who was a woman) said to the (male) consultant: "Your wife can't make lunch at the usual time tomorrow, so she moves it forward". What the researcher was trying to get at was whether *moving forward* means bringing it towards the present or pushing it further in the future. And the language consultant replied: "My wife always makes lunch at *pyryrymkuara*", which means midday, when the sun is the highest. So the researcher then says: "OK, it's me. I have to move the lunch forward." And the language consultant says: "Then you are a lazy woman". Because the point is that for these people, an activity or event, and the time of day at which the activity or event conventionally occurs, are so bound together that pulling them apart means violating a social norm; and that is why in some ways it is quite difficult trying to convey to the consultants the meaning of these metaphoric mappings like "moving forward".

Do our findings mean that we should conclude that the Amondawa are "a people without time"? Well, they do not have a calendric system. There is no grammaticalised time, and there is no lexicon of Time-as-Such. And, although there is a complex space and motion system, and we have evidence of fictive motion constructions in space, there is no convincing evidence of conventionalised linguistic space-time mapping. Fictive motion, as discussed by Talmy, involves expressions like *the mountain range goes from north to south*. What we are doing in such expressions is linguistically conceptualising the path of the mountain range in terms of the direction of motion of a fictive

or virtual observer, who might travel along the mountain range. Another example: we could say something like *the path goes to the river*. Now, we have tried to elicit constructions like that in Amondawa, and speakers had no problem in producing such utterances. So it is not as if Amondawa people are reluctant to take spatial motion verbs and use them in what we might call metaphorical, or analogical, or quasimetaphorical constructions. In this case, they do it. The point is they don't do it spontaneously in constructions that conceptualise and express temporal relations. And the reason, we think, that they don't do that is *cultural*. It is not something to do with the language in itself.

On the other hand, there is a complex nominal aspect system. The Amondawa, like all human groups, are able to linguistically conceptualise interevent relationships which are, by definition, temporal. They do talk about future and past, in other words. They lexicalise past and future in temporal deixis. They have at least three *event-based* time interval systems. That is to say, they have the time interval system of seasons, they have the time interval system of days, and they have the time interval system of life stages. And when I say they conceptualise interrelationships, they are able to tell narratives in which one thing follows after another. They have cultural narratives of the collective past and mythic narratives. So it would be just wrong to say that the Amondawa are "People without Time", or that the Amondawa language is a "Language without Time". What they lack, as it were, is a notion of Time-as-Such, as a domain which can receive metaphoric or analogical mapping from space.

Conclusions to the Case Study

Claimed universals in temporal cognition and language, and particularly the universality of metaphoric mappings of spatial motion to time, are motivated by compelling interdomain analogical correlation, because motion occurs in time, and may be facilitated by neural structure. That could be true.

However, the linguistic elaboration and entrenchment of space-time mapping is culturally driven. "Time-as-Such" is not a cognitive universal, but a socio-cultural, historical construction based in social practice, semiotically mediated by symbolic and cultural-cognitive artefacts, and entrenched in lexico-grammar. Linguistic space-time mapping, and the recruitment of spatial language for structuring "Time-as-Such", is consequent on the cultural construction of this cognitive and linguistic domain. We need to reexamine the notion of cultural evolution and its place in language and cognitive variation, without postulating universal pathways of evolution and culture, and by situating cultural practices in social ecology and habitus.

And now I will take this one step further, and say that we can now specify this as a particular hypothesis in relationship to the linguistic and cognitive representation of space and time, which we called the Mediated Mapping Hypothesis. The widespread linguistic mapping (lexical and constructional) between space and time, which is often claimed to be universal, is better understood as a "quasiuniversal", conditional, not absolute. Though not absolutely universal, linguistic space-time mapping is supported by universal properties of the human cognitive system, which (together with experiential correlations between spatial motion and temporal duration) motivate linguistic space-time mapping in linguistic conceptualisation.

However, the linguistic elaboration of this mapping is mediated by number concepts and number notation systems, the deployment of which transforms the conceptual representation of time from event-based, to time-based time interval systems; eventually yielding the culturally constructed concept of Time-as-Such. And the conceptual transformation of time interval systems by numeric notations is in large part accomplished by the invention and use of artefactual symbolic cognitive artefacts such as calendric systems. And in the absence of this, we don't get the notion of Time-as-Such. And we don't get metaphoric space-time mapping.

To (almost) conclude this lecture, here is a quote from the philosopher Merleau-Ponty, which I think impressively and beautifully elaborates the idea of extended embodiment: "The body is our general medium for having a world. Sometimes the meaning aimed at cannot be achieved by the body's natural means; it must then build itself an instrument, and it projects thereby around itself a cultural world." In a way what Merleau-Ponty is saying here is that we have two human natures. The nature which is common to us on account of our shared organismic bodies, but also the human nature that we create for ourselves as cultural form, cultural mediation and cultural meaning. And to answer the question posed in the title of the lecture: language, culture and mind are not three radically separate phenomena or systems, but deeply interwoven with each other in the human biocultural niche.

Find out more
(work by Chris Sinha and colleagues relevant to this topic): Multimedia presentations (Vera da Silva Sinha and Chris Sinha):

• Video: Time in Culture https://vimeo.com/261572557

• Podcast: The Language of Time https://timelyapp.com/abouttime/

• TEDx Talk: TEDxVienna 2019 https://www.tedxvienna.at/abouttime/

Further reading:

Silva Sinha, V. da. (2019). Event-based time in three indigenous Amazonian and Xinguan cultures of Brazil. Frontiers in Psychology (Section Cultural Psychology) 10, 454 doi: 10.3389/fpsyg.2019.00454

Silva Sinha, V., Sinha, C., Sampaio, W. and Zinken, J. Event-based time intervals in an Amazonian culture. In Luna Filipović and KasiaJaszczolt (Eds.) Space and Time in Languages and Cultures II: Language, Culture, and Cognition. Human Cognitive Processing Series 37. Amsterdam: John Benjamins.

Sinha C. (2017) Ten Lectures on Language, Culture and Mind. Cultural, developmental and evolutionary perspectives in cognitive linguistics. Boston and Leiden, Brill. x + 180 pp. http://www.brill.com/products/book/language-culture-and-mind

Sinha, C., Silva Sinha, V. da, Zinken, J. and Sampaio, W. (2011). When time is not space: The social and linguistic construction of time intervals and temporal event relations in an Amazonian culture. Language and Cognition 3, 137-169. DOI 10.1515/langcog.2011.006

Sinha, C. and Gärdenfors, P. (2014) Time, space and events in language and cognition: a comparative

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