LINGUISTIC DETERMINISM: LANGUAGES GOVERNING OUR UNIVERSE

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Abstract. Abstract everyday concepts such as time, space and numbers, although conceptualized in the same human experience of the world, can be perceived in very distinctive ways based on the linguistic variability of the native language. There are multiples examples around the globe that prove how the way time, space and even numbers are perceived can vary drastically from culture to culture based on the specificity and features of a given language. Thus, some scientists have claimed that linguistic relativity (or more strongly linguistic determinism) is not only a theory, but a scientific fact. Within this theory's framework, language connects, shapes and determines thought, therefore it is argued that the universe that we perceived is actually an invention of our cognition through language.

1 INTRODUCTION

Human beings share the common instinct of survival and prosperity, but do all humans think in a similar way? The answer lies within the way we share our thoughts and how these thoughts become transmissible through language. Nowadays, linguists estimate that there are around 7000 languages alive on our planet and this linguistic diversity creates a barrier towards the commonality of thoughts.

Even the most vital concepts of time, space and numbers seem to be perceived differently as a result of the limits and features of the language a person speaks. All around the world, exceptional cases of this linguistic diversity have been brought into academic attention: languages with no tenses, special orientation features and even languages with no numbers have been documented in the last century.

Researchers have been struggling with linguistic relativity for a long time and many linguists aim to create a direct relation between language and thought. Thus, trying to understand how language influences the way we think has become a very important and popular research line.

2 LANGUAGES AND THE PERCEPTION OF TIME

The perception of time and its relation with languages has been point of debate for many generations and some linguists have investigated unusual cases their entire careers. Benjamin Lee Whorf, actually an engineer by profession, studied Native American linguistics for decades and became the first of a series of academicians who have studied *Hopi* language and how time is grammaticalized. Hopis are a small tribe in Arizona, USA with about 6000 Hopis living at the moment (see figure 1). As author Gipper [6] mentions, there is no comprehensive grammar and no dictionary of the language and it lacks written communications.

After years of research, Whorf concluded that Hopi languages has no reference to time neither implicitly nor explicitly. Moreover, he argued that not only there are no nouns denoting time intervals, such as *time*, *day*, *hour*, etc, but also that the language is tenseless, i.e. has no concepts of past, present of future whatsoever. These claims and how actually Hopi language conceptualizes time and the differences (or lack of them) between English and Hopi speakers' way to understand time has become a long-standing controversy among linguists, even coining the term *Hopi term controversy* to denote the matter which originated back in the 1940's. In 1983, Ekkehart Malotki in a 600-page publication [9] intended to refute Whorf's claims presenting multiple examples of words and grammatical forms of the how Hopi do indeed conceptualize time using spacial relations.

Figure 1: Members of Hopi tribe in the Hopi Indian Reservation, Arizona, US

Regardless of not knowing with certainty how the concept of time is perceived by Hopis, the majority of linguists nowadays agree with Malotki's theory that time is understood through an analogy with space. Years later, the debate is still on and new studies have been focused on the way time and space conceptualizations are related. Linguist Lera Boroditsky [2] conducted a series experiments with English and Chinese speakers. Even though the experiments were conducted entirely in English, native Mandarin speakers were quicker to answer simple questions about earlier and later after being presented with vertical cues, whereas English speakers were faster after horizontal hints. These results can be explained considering the fact that in English people predominantly talk about time as if it were horizontal, while Madarin usually understands time as vertical. Similarly, a language called *Aymara*, which is spoken by millions in the Central Andes, relates the concept of past as it were in front of them, instead of behind [4], which would seem normal to English speakers.

Even pre-Columbian civilizations seem to have had very complex languages regarding time and space. Yucatec Maya, for instance, was a language spoken by around 1.2 million

people in Mexico and Belize during the days of Maya culture. This language lacked temporal connective words, such as *after*, *before*, *until* and *while*, and instead speakers relied on complex strategies using context, eventuality, progressive and imperfective aspects. Even calendars, which for most people has a concept of being linear, had a circular representation in the Maya culture (see Figure 2).

Figure 2: Maya calendar

More recent studies have added a new element to the discussion: the relativity of the time with respect to the language chosen by bilingual speakers. Professor Panos Athanasopoulos, a linguist from Lancaster University and Professor Emanuel Bylund, a linguist from Stellenbosch University and Stockholm University, have claimed in one of the articles [3] that the language we choose can make us experience time in a very language-specific way. As the scientists explain, distinct languages frame time differently. Swedish and English speakers, for instance, usually think of time in terms of distance: *what a long day*, for example. Spanish speakers, on the other side, tend to express time in terms of volume: *what a full day*, they would exclaim. In the experiment of Prof. Bylund and Athanasopoulos, the subjects were shown a short clip with a line growing for few seconds and they were supposed to estimate roughly how much time it took for the lines to grow. The experiments showed, as the authors explained, that "the Swedish speakers tend to think that the line that grows longer in distance, takes longer", but instead "Spanish speakers arent tricked by that. They seem to think that it doesnt matter how much the line grows in distance; it still takes the same time for it to grow". On the other hand, Spanish speakers seemed to fail using a different condition: instead of using a growing line, the scientists showed them a contained that appeared to be filled. This task was design to mimic the volumetric conception of time in Spanish.

In order to discard the possibility of cultural factors affecting the results, Bylund and Athanasopoulos also conducted experiments using bilingual Spanish-Swedish speakers and the outcomes remained the same. The subjects given instructions in Spanish had no problem correctly estimating the time it took for a line to grow, but had some difficulties with the task of the glass being filled. Similarly, when the subjects were instructed in Swedish, the participants had no troubles with the volumetric task, but struggle with the growing lines.

3 SPACE AND LINGUISTIC ORIENTATION

Human beings think spatially, not exclusively though, but there is no doubt, it is one of the fundamental tricks of human cognition. Casting non-spatial problems into spatial thinking gives us literacy, geometry, diagrams, mandala, dream-time landscapes, measures of close and distant relatives and of high and low social groups, and much more. Just as maps stand in an abstract spatial relation to real spatial terrain, so spatial arrangements

can give us symbolic maps to other domains. From what this cognitive advantage derives is not satisfactorily explained, but it is perhaps not fanciful to imagine that it is just another way that ancient brain structures (to do, for example, with navigation) are put to new uses in the extended symbolic world that human beings inhabit.

A way to study the everyday use of spatial concepts is to investigate the language of spatial description. How do people refer to places, describe spatial arrangements, say where someone is going, and so forth?. Frequently one can see direct connections between classical questions of cosmology, aesthetics and art style, practical activities like hunting or herding, and the linguistic resources used to make spatial distinctions in different cultures [8].

Space is not a restricted to a semantic domain, like (arguably) color or kinship. As a pre-theoretical notion, space covers at least location and motion, and arguably shape as well in fact much of what we talk about. Few languages have lexicalized the abstract of super-ordinate concept space itself in the way that the European ones have.

It is therefore worth asking whether there is cross linguistic evidence for a super-ordinate domain here. There is at least this evidence: as far as we know, all languages have *where* questions and literal answers to which are spatial descriptions. However, not all languages have one super-ordinate question form: Many distinguish *whence*, *whereto*, and *where*, others *where (location)* from *where (motion to/from)*, although mostly such forms show morphological relatedness one to another.

There are reasons to think that the spatial domain has internal natural cleavages, according to the intellectual problems posed by the need to describe different kinds of spatial arrays or events.

For example, an Aboriginal community of Cape York Peninsula in Australia (see Figure 3) does not use words like *left* and *right* for orientation. As a matter of fact, in this language everything is located using cardinal directions: north, south, east and west. In fact, the way that you say *hello* in Kuuk Thaayorre would be analogous to say *Which way are you going?* in English. And the answer should be: *North-northeast in the far distance. How about you?*, for instance.

Figure 3: Renowned linguist, Lera Boroditsky, with children on Cape York Peninsular

As a result, people who don't understand where to go could not get past *hello* and orientation can be very difficult, but for people in this tribe orientation is a process more effective and faster and, in fact, people who speak languages like this stay oriented really well. They stay oriented better than English speakers used to think humans could. As a result, the claim that humans are worse than other creatures because of some biological excuse becomes refutable. Thus, in a way, if your language and your culture trains you to do it, actually, you can do it.

4 COUNTING AND NUMBERS

Numbers make it possible for us to perceive quantities and language reflects the reality of these quantities. Language provides a broad array of words for numbers, we can count from 0 to 10 and beyond, and we can even judge quantities on relative scale such as *few*, *many*, *plenty*, *enough*, etc. Most of the time, our lexicon helps us differentiate between a single object and a group of them by providing the corresponding plural form of the nouns. In different cultures of the world numbers are perceived in a different way with specific linguistic messages associated. For instance, number 786 in Indo-Pak regions is used by Muslim communities in the start of writing any document. On the other hand, some numbers come with with an inherent negative cognotation, such as number 5 in Chinese, whose pronunciation is similar to the word death; or number 13 in American Culture is related to bad luck, so builders skip this value for floor numbering. Even in the academic circles, certain numbers have universal meanings and we have set pattern of thoughts towards them: numbers like 9.98, 3.14, for example.

Figure 4: Members of the Piraha tribe being interviewed by American linguist Caleb Everett

There are even few languages on the face of Earth which lack numerics at all. *Piraha* is a language spoken by a tribe of the same name that dwells in the heart of the Amazonian forests (see Figure 4). They have no words whatsoever to express numbers and members of the tribe can only rely on terms like *around*, *some* and *many* to describe quantities. In addition, words such as *hoi* can mean both *one* and *few*, simultaneously. Thus, their language lacks the essential features to quantify objects per se and the concept of quantity becomes diffuse and undefined. Peter Gordon [7] from Columbia University conducted a study to measure the cognitive abilities of members of the Piraha tribe by assessing their arithmetic skills. The subjects were given the task to repeat certain patterns and to memorize groups with a given number of objects that varied from 1 to 10. Surprisingly, the performance of the members was very poor with quantities greater than three revealing that they could not grip the concept of numbers at all. As a result, the author concluded that "People without words for number does not develop the ability to determine exact number".

Another fascinating factor is the invention of numbers themselves, which answer lies in our own hands. This this reason why it is important to notice that we use decimal system in the majority of languages and few ones with base 5 and base 20, which are also multiple of base 10. We speak decimal languages because our ancestral tongue Proto-Indo European was decimal-oriented and such information has passed down across generations. Thus, the number five in many language derived from the word *hand* [5].

5 NOTION OF LINGUISTIC RELATIVITY AND DETERMINISM

Does our language affects how we see the world?, the question was answered by a researcher Sapir through his well known Sapir-Whorf hypothesis. His theory states that language influences the way that members of a culture see the world and gives an explanation to some interpersonal miscommunications. There are two parts of this hypothesis: the first one is what is called *Linguistic Determinism*, that basically claims the structure of a language can determine the way the speaker think. In other words, our language tells us what to think. For instance, for an Russian speaker time is divided into past, present and future tense as those are the only available tenses in the language. According to this theory, as long as a Russian person does not learn other language, the concept of time will remain limited to those three time frames and all remaining possibilities are completely non-existing in the mind of the Russian speaker.

The concept of *coconut* for members of a community in the Solomon Island can be another example of this theory. Being coconuts such an important part of their daily basis, they happen to have nine different words to denote a coconut. Thus, there is no single concept of coconut fir them, but instead the concept has been widened and diversified into a variety of individual concepts. The same thing happens for Russian speakers regarding colors: Russian language does not have a single concept for blue, but rather Russian speakers use *sinij* and *goluboj* [1].

The second part of the theory explains the concept of *Linguistic Relativity*, which states that people who speak different languages will see the world differently. For instance, in Mandarin culture the word *Lao* means *respect for the elder people*, whereas in English there is no single word that can express the same meaning directly. Instead, English speakers need to explain further using *old* and *respect* and a fully constructed sentence. Based on this and more examples, followers of this theory believe that Mandarin people have a deeper respect for the elderly in comparison with English speakers.

6 CONCLUSIONS

The examples presented in this article could compel us to deduce that people are only capable of constructing thoughts for which they have actual words and ultimately language is not a way to express our thoughts, but instead it plays a substantial role in creating them. Besides, language seems to tell us about the origin, purpose and features of a certain culture and how language helps them understand what is in the world.

Although there are many hypotheses related to the relativity of linguistics and how they might (or not) shape the universe around us, it is a fact that there are many cases of languages where common concepts of time, spaces and numbers are constrained by specific linguistic features. The question then lies not in the existence of those cases, but in the way they are explained and theorized. For many linguists, linguistic relativity is a scientific fact whereas, for others, it remains just a theory and more proof is needed in order to be scientifically correct.

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