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# To Explore the Relation between Language and Thought through Pirahã, an Indigenous South American Language

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## Abstract

**Since it was first discussed in the 19th century, the debate over the relation between language and thought has spawned many variations. The article aims to briefly discuss the relation between language and thought through Pirahã, an indigenous South American language. Pirahã is a special language of a primitive society where we see no objective requirement for mathematics, so there is no need to develop a numeral system, which objectively further contributes to the phenomenon that people in this community cannot count. On the basis of summarizing the discussion of the relation between language and thought in history, the article also aims to support the view of linguistic relativity with this unique language. Finally, the article will bring the discussion to a conclusion based on the discussion and give some ideas out of the discovery.**

## Keywords

**Language and Thought; Language Relativism; Pirahã.**

## 1. Introduction

Debate over the relation between language and thought never ceases. “Over the history, the relation between language and thought was first introduced in the 19th century by Johann Herder and Wilhelm von Humboldt.”(1) It was not before last century that this debate was resumed by Edward Sapir and his Student Benjamin Lee Whorf, as well as many other great anthropologists like Franz Boas.

Certainly, Herder and von Humboldt are two incontestable early precursors of the debate. Under the French political and military hegemony, they claimed (1772) openly that a nation’s language reflected the way its people thought according to the equation: one language = one folk = one nation. At about the same time, von Humboldt expressed (1772) that the relation between language and viewpoint as follows, “…there resides in every language a characteristic world-view… By the same act whereby man spins language out of himself, he spins himself into it, and every language draws about the people that possesses it a circle whence it is possible to exit only by stepping over at once into the circle of another one.”

In these rather distinctive statements, the two German philosophers questioned Descartes’ claim on the universality of human reason, which was based on the universal ability of human rational thinking, namely Messianic universalism related to the Napoleonic imperialist movement. They believed that the motto of “I think, therefore I am” does not apply to all human beings, because there is no thought that is out of substance that is not shaped by language. “If human language interferes with a person’s existence and her thoughts, then a person’s social existence itself will be affected by his or her speech and grammar.”(1)

Today, linguistics debates about the relationship between language and thinking evolve much and can be summarized into the following four categories: language precedes thought; thought precedes language; language determines thought; thought determines language. So, in the next

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few paragraphs will briefly explain these relationships and associate these opinions with the indigenous South American language Pirahã to uphold its point of view.

## 2. Language Determines Thought

The main linguists who hold this view are Humboldt, Sapir and Whorf. Among the three of them, the latter has an inherited relationship with the former. Whorf greatly developed this school's view and absolutized the relationship between the two. "Under the guidance of Sapir, he mainly studied Hopi language, further demonstrated Sapir's view on the relationship between language and thought, and put forward the famous language relevance theory, that is, Sapir-Whorf hypothesis."(6) Wolf believed that the formation of ideas is not an independent process, but a part of a special grammar; language is the shaper of ideas and determines a nation's worldview: people with different languages have different views of the world. This hypothesis has something reasonable, but it is too absolute. On the lexical and semantic plane, this hypothesis is reasonable, but it should be pointed out that people can always try to explain concepts that are not in their own language. To prove Whorf's hypothesis, we must prove: (1) The thinking styles of all nations have nothing in common, but the establishment of philosophy, logic, and psychology has provided counter-evidence, which shows that human thinking has many things in common; (2) The language systems used by different peoples to express their ideas have nothing in common, and it is difficult to prove such a logic. Whorf's hypothesis has a fatal weakness—linguistic determinism: language can determine people's thinking and people's worldview. Then, people and races of different languages cannot communicate; so "there is no way to translate between languages. The advanced nation will always be advanced."(1)

## 3. Thought Determines Language

Psychologist Piaget and Vygotsky held different views. "They believed that in the process of language use, cognition precedes language, and thinking determines language; in the process of using language, the relationship between language and thinking is getting closer and closer, but there is still thinking without language."(6) In their view, from the perspective of "germ line" development, thinking and spoken language have different genetic roots. Their development is not parallel, and their development curves often cross. First, look at the thinking of chimpanzees. Chimpanzees have primitive intelligence. For example, they can use tools to form small branches into long branches and fruit. Vygotsky believed that the primitive intelligence of chimpanzees has nothing to do with spoken language, and it does not need to use language to think. Secondly, chimpanzees also have their own "language." For example, they can use facial expressions, gestures, and voice communication. They can express and understand each others' expressions and gestures; the problem is that these expressions and gestures are directly related to actions, and sound is a way to express desires, feelings, and subjective states, and is not a symbol of "objective" things. Chimpanzees can make sounds, but these sounds have nothing to do with thinking. In addition, they agreed with a view that language and thinking are not produced at the same time; thinking precedes voiced language; individual development depends on thinking and language. Babies will babble and yell in the first few months after birth. These voices are mainly expressing emotions and have nothing to do with the development of thinking. It is not until the age of two that the previously developed thinking and language converge and form new behavior patterns. Then language can become a tool of thinking, and thinking can be expressed with sound.

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## 4. Language Relativism of the Indigenous Language Pirahã

Have you laughed when you saw a guy walked straight into a fountain because he was not paying attention? Then, that is you are taking pleasure in other people's misfortune, and the Germans called it schadenfreude; schaden means "harm" and freude means "joy". So, in English, it is translated into "harm-joy". How is it that the Germans have a term like schadenfreude and some people in different countries do not? According to Sapir-Whorf Hypothesis, language affects how we perceive and think about the world around us and that some thoughts and perceptions of individuals in one language cannot be understood by others who live with other language.

### 4.1. Language Relativism

There are two theories to this hypothesis: Linguistic Determinism and Linguistic Relativism. The former states that language determines how people think and feel whereas the latter states that language affects the way people perceive and experience the world. The study shows that "Mandarin speakers are more likely to talk about time vertically,"(6) for example, last month(上个月 in Chinese) is perceived as upward while next month(下个月 in Chinese) is perceived as downward. Additionally in English, however, we are more likely to talk about time horizontally where next month is perceived as forward and last month is perceived as backward. Also, the brains of Papua New Guniea perceive colors differently than ours. Researches have shown that they only have five different color groupings while we have ten or more.

So, back to schadenfreude, some people are familiar with this feeling of having pleasure from other people's misfortune. However, they just do not have a word for it like the German do. So if Sapir-Whorf Hypothesis is true, then they should not have an experience or thoughts like schadenfreude. Was that being said is true? People living with different cultures may say either yes or no.

In the 1930's, Benjamin Lee Whorf talked about language this way. He argued (1930) that different languages represent different ways of thinking about the world around us. This view has come to be called linguistic relativity. Exploring the grammar of Hopi language, he concluded (1930) that the Hopi has an entirely different concept of time than European languages do and that European concepts of "time" and "matter" are actually conditioned by language itself. One practical consequence of linguistic relativity: direct translation between languages is not always possible. Sine Hopi and English are not simple ways of expressing the same thing in different words, you cannot actually preserve thoughts and viewpoints when you translate between them.

"In its strongest expression, linguistic relativity – the idea that viewpoints vary from language to language – relies on linguistic determinism – the idea that language determines thought." (1) In other words, how people think does not just vary depending on their language, but is actually grounded in – determined by – the specific language of their community. Linguistic relativity has been abandoned and criticized over the decades with critics aiming to show that perception and cognition are universal, not tied to language and culture. But some psychologist and anthropologists continue to argue that differences in language's structure and words may play a role in determining how we think. Experiments on how speakers of different languages approach non-linguistic tasks continue to spark this debate.

### 4.2. Language Pirahã -- An Evidence of Language Relativity

Among all kinds of languages on the earth, there is a language called Pirahã, which is the one of the most unusual languages in the world. In this language, there are only three words related to quantity: "hói"(1), "hoí"(2) and "aibaagi"(many)(2). The Pirahã tribe is an indigenous tribe with hundreds of people living in the lowlands of the Amazon jungle. Scientist Gordon, with the

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help of two researchers who have lived with the local tribes for 20 years, visited several villages of the Pirahã people for a period of one week to two months. When locals here conduct limited transactions with outsiders, “even if they can understand that the quantifiers used by the other party are part of Portuguese (the official language of Brazil), they do not understand their meaning.”(2) In daily counts, locals will also use fingers as an aid, but even counts within 5 will cause big errors. Pirahã, who lacks an accurate quantitative vocabulary, also lacks the ability to count accurately. The most amazing thing is that the first two words about quantity of Pirahã people do not specifically correspond to “one” and “two”. Sometimes “hói” is used to refer to a relatively small number, such as 2 or 3, while “hoí” used to refer to a quantity that is a little larger than “hói”, such as 5 or 6. In other words, there is no quantifier in Pirahã that corresponds to a specific number.

Gordon designed a matching task for Pirahã people to verify their mathematical ability. He sat opposite the indigenous people and separated the wooden table in front of him into two parts with a wooden stick. Gordon will place a different number of small objects(such as batteries, spindles, nuts, etc.) on the table in front of him, and the other party needs to place the same number of batteries in his hand. Researchers will arrange the objects according to different organizational principles when preparing the questions, either in a row, or randomly, or in an array with unequal intervals, or covering the objects after a brief presentation, or stacking the objects in a jar to let the other party to observe, and so on (4). As a result, after Pirahã people completed the task of 2 to 3 objects well, more and more errors appeared as the number increased. (4) “The accuracy of some tasks dropped to 75%,”(4) and some tasks(using wooden sticks to draw an equal number of lines on the ground) even dropped to zero. (5) In order to further understand the meaning of the three numerals of the Pirahã people, another group of scientists also went deep into this Amazonian group and conducted an experiment: they showed 10 local people some yarn balls wound on a shaft and asked questions, “How much/many is this?” Of course, there are only three possible answers: “hói”, “hoí” and “aibaagi”. There are ten different yarn clusters from 1 to 10, of which 6 subjects received a gradual ascending sequence from 1 to 10, and the other 4 received a descending sequence from 10 to 1. The result is that in ascending order(from 1 to 10), all “1” are represented by “hói”, all “2” are represented by “hoí”, and “aibaagi” begins to appear in the subsequent quantities (5). And the usage rate is getting bigger and bigger. However, the descending order(from 10 to 1) is very different: “hói” is used in the range of 1~6, “hoí” is used in the range of 4~10, and “aibaagi” 7~10. The new discovery is: “under different presentation methods, the same quantity has been described differently.”(5) What do all these results mean? From the perspective of Sapir-Whorf Hypothesis, there will be some meanings between two languages that cannot be transmitted through translation, and this difference may cause people who speak different languages to use different ways to deal with things, and then have a different way of thinking.

For people using Pirahã as their mother tongue, precise counting may not make sense to some extent. They only have so much space to live in. If you ask A how many children she has, she can name them all, but she won't tell you the exact number.

However, as to what a mathematical idea is in this society, it is worth considering indeed. In general, mathematics is an abstract ability that involves recognizing and classifying objects by abstracting their shapes. From this point of view, all people have this ability. However, when it comes to a specific mathematical model, it may not be understood by everyone. The decimal system is just an arithmetic model, not something that everyone is born with and is handed down through culture, especially for Pirahã community.

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## 5. Conclusion

When we talk about language, we often dig down to universal categories like nouns and verbs, consonants and vowels, phrases and sentences. We end up with these cross-language concepts that language is grounded in our way of thinking and information processing which is itself universal among humans. Languages and cultures are superficial and, but language and cognition could run deep. However, it is not the only way to look at language. What if the language we are brought up to speak actually relates to the way we look at the reality? From this perspective, language is a particular way of conceptualizing world, and has close ties to culture.

"The strong version of linguistic relativity, or linguistic determinism, has been pretty much discarded, for a variety of convincing reasons, and a weak form of the hypothesis has remained generally accepted."(1) It is clear that translation is possible among languages, even though some meaning does get lost in translation, so the language web that Humboldt refers to does not seem to be spun as tightly as he suggests. Bi- or multilingual individuals are able to use their various languages in ways that are not dictated by the habits of any one speech community. And, with the increasing diversity of speakers within speech communities around the globe, it is increasingly difficult to maintain that all speakers of a language think the same way.

In the discussion of the relationship between language and thought, we always mention more "linguistic relativity", but rarely mentioned "linguistic determinism". However, when we generally talked about Sapir-Whorf Hypothesis, both strong and weak forms are mentioned, that is, the strong form is that language determines thinking, and the weak form is that language influences thinking. The article aims to illustrate that Sapir-Whorf Hypothesis does not distinguish too much between strong and weak versions. "Language determinism" is "linguistic relativity", which believes that thinking exists relative to language, that is, people with different languages have different ways of thinking. Because we use a specific word system to segment nature to obtain concepts, and also use specific language patterns(grammar) to combine concepts, and our thinking depends on these concepts and concept combinations, so many used "language relativity" to refer to Sapir-Whorf Hypothesis, and also, to include the so-called "linguistic determinism".

By observing the research on Pirahã language, we can discover how the lack of counting vocabulary in the mother tongue will have a negative impact on the counting ability of language users. In fact, Pirahã is a single-language nation, scattered in the Amazon basin, currently not integrated into Brazilian society, and still in a primitive society of hunting-gathering lifestyle (3). Currently, Pirahã people are also trying to get in touch with the outside world. Some men speak a simplified Brazilian Portuguese, while women only speak the native language. Such a closed cultural environment makes Pirahã rarely trade and cultural exchanges with the outside world. Therefore, the people there have not successfully developed in their own language, or "borrowed" the concept of the counting system from the external environment. Therefore, the lack of the concept of counting in the language has seriously affected numerical cognition and ability of the locals. Personally, the author thinks that language should have a certain influence on mathematics ability. For example, for children whose mother tongue is English, when their parents have taught more than 40, the children will learn how to count by themselves, but for children whose mother tongue is French, parents may have to teach to 100 before the children can count by themselves because of the particularity of the French number system.

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