



# Linguistic relativity

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**Linguistic relativity** asserts that language influences worldview or cognition. One form of linguistic relativity, linguistic determinism, regards peoples' languages as determining and influencing the scope of cultural perceptions of their surrounding world.<sup>[1]</sup>

Several various colloquialisms refer to linguistic relativism: the **Whorf hypothesis**; the **Sapir–Whorf hypothesis** (/səˈpiərˈhwɔːrf/ *sə-PEER WHORF*); the **Whorf-Sapir hypothesis**; and **Whorfianism**.

The hypothesis is in dispute, with many different variations throughout its history.<sup>[2]</sup> The *strong hypothesis* of linguistic relativity, now referred to as linguistic determinism, is that language *determines* thought and that linguistic categories limit and restrict cognitive categories. This was a claim by some earlier linguists pre-World War II;<sup>[3]</sup> since then it has fallen out of acceptance by contemporary linguists.<sup>[4]</sup> Nevertheless, research has produced positive empirical evidence supporting a *weaker* version of linguistic relativity.<sup>[4][3]</sup> that a language's structures influence a speaker's perceptions, without strictly limiting or obstructing them.

Although common, the term *Sapir–Whorf hypothesis* is sometimes considered a misnomer for several reasons. Edward Sapir (1884-1939) and Benjamin Lee Whorf (1897-1941) never co-authored any works and never stated their ideas in terms of a hypothesis. The distinction between a weak and a strong version of this hypothesis is also a later development; Sapir and Whorf never used such a dichotomy, although often their writings and their opinions of this relativity principle expressed it in stronger or weaker terms.<sup>[5][6]</sup>

The principle of linguistic relativity and the relationship between language and thought has also received attention in varying academic fields, including philosophy, psychology and anthropology. It has also influenced works of fiction and the invention of constructed languages.

## History

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The idea was first expressed explicitly by 19th-century thinkers such as Wilhelm von Humboldt and Johann Gottfried Herder, who considered language as the expression of the spirit of a nation. Members of the early 20th-century school of American anthropology including Franz Boas and Edward Sapir also approved versions of the idea to a certain extent, including in a 1928 meeting of the Linguistic Society of America,<sup>[7]</sup> but Sapir, in particular, wrote more often against than in favor of anything like linguistic determinism. Sapir's student, Benjamin Lee Whorf, came to be considered as the primary proponent as a result of his published observations of how he perceived linguistic differences to have consequences for human cognition and behavior. Harry Hoijer, another of Sapir's students, introduced the term "Sapir–Whorf hypothesis",<sup>[8]</sup> even though the two scholars never formally advanced any such hypothesis.<sup>[9]</sup> A strong version of relativist theory was developed from the late 1920s by the German linguist Leo Weisgerber. Whorf's principle of linguistic relativity was reformulated as a testable hypothesis by Roger Brown and Eric Lenneberg who performed experiments designed to determine whether color perception varies between speakers of languages that classified colors differently.

As the emphasis of the universal nature of human language and cognition developed during the 1960s, the idea of linguistic relativity became disfavored among linguists. From the late 1980s, a new school of linguistic relativity scholars has examined the effects of differences in linguistic categorization on cognition, finding broad support for non-deterministic versions of the hypothesis in experimental contexts.<sup>[10][11]</sup> Some effects of linguistic relativity have been shown in several semantic domains, although they are generally weak. Currently, a nuanced opinion of linguistic relativity is espoused by most linguists holding that language influences certain kinds of cognitive processes in non-trivial ways, but that other processes are better considered as developing from connectionist factors. Research emphasizes exploring the manners and extent to which language influences thought.<sup>[10]</sup>

## Ancient philosophy to the Enlightenment

The idea that language and thought are intertwined is ancient. In his dialogue Cratylus, Plato explores the idea that conceptions of reality, such as Heraclitean flux, are embedded in language. But Plato has been read as arguing against sophist thinkers such as Gorgias of Leontini, who claimed that the physical world cannot be experienced except through language; this made the question of truth dependent on aesthetic preferences or functional consequences. Plato may have held instead that the world consisted of eternal ideas and that language should represent these ideas as accurately as possible.<sup>[12]</sup> Nevertheless, Plato's Seventh Letter claims that ultimate truth is inexpressible in words.

Following Plato, St. Augustine, for example, argued that language was merely like labels applied to concepts existing already. This opinion remained prevalent throughout the Middle Ages.<sup>[13]</sup> Roger Bacon had the opinion that language was but a veil covering eternal truths, hiding them from human experience. For Immanuel Kant, language was but one of several methods used by humans to experience the world.

## German Romantic philosophers

During the late 18th and early 19th centuries, the idea of the existence of different national characters, or *Völksgesister*, of different ethnic groups was a major motivator for the German romantics school and the beginning ideologies of ethnic nationalism.<sup>[14]</sup>

### Johann Georg Hamann

Johann Georg Hamann is often suggested to be the first among the actual German Romantics to discuss the concept of the "genius" of a language.<sup>[15][16]</sup> In his "Essay Concerning an Academic Question", Hamann suggests that a people's language affects their worldview:

The lineaments of their language will thus correspond to the direction of their mentality.<sup>[17]</sup>

### Wilhelm von Humboldt

In 1820, Wilhelm von Humboldt associated the study of language with the national romanticist program by proposing that language is the fabric of thought. Thoughts are produced as a kind of internal dialog using the same grammar as the thinker's native language.<sup>[18]</sup> This opinion was part of a greater idea in which the assumptions of an ethnic nation, their "Weltanschauung", was considered as being represented by the grammar of their language. Von Humboldt argued that languages with an inflectional

morphological type, such as German, English and the other Indo-European languages, were the most perfect languages and that accordingly this explained the dominance of their speakers with respect to the speakers of less perfect languages. Wilhelm von Humboldt declared in 1820:

The diversity of languages is not a diversity of signs and sounds but a diversity of views of the world.<sup>[18]</sup>

In Humboldt's humanistic understanding of linguistics, each language creates the individual's worldview in its particular way through its lexical and grammatical categories, conceptual organization, and syntactic models.<sup>[19]</sup>

Herder worked alongside Hamann to establish the idea of whether or not language had a human/rational or a divine origin.<sup>[20]</sup> Herder added the emotional component of the hypothesis and Humboldt then took this information and applied to various languages to expand on the hypothesis.

## Boas and Sapir

The idea that some languages are superior to others and that lesser languages maintained their speakers in intellectual poverty was widespread during the early 20th century.<sup>[21]</sup> American linguist William Dwight Whitney, for example, actively strove to eradicate Native American languages, arguing that their speakers were savages and would be better off learning English and adopting a "civilized" way of life.<sup>[22]</sup> The first anthropologist and linguist to challenge this opinion was Franz Boas.<sup>[23]</sup> While performing geographical research in northern Canada he became fascinated with the Inuit and decided to become an ethnographer. Boas stressed the equal worth of all cultures and languages, that there was no such thing as a primitive language and that all languages were capable of expressing the same content, albeit by widely differing means.<sup>[24]</sup> Boas saw language as an inseparable part of culture and he was among the first to require of ethnographers to learn the native language of the culture to be studied and to document verbal culture such as myths and legends in the original language.<sup>[25][26]</sup>

Boas:

It does not seem likely [...] that there is any direct relation between the culture of a tribe and the language they speak, except in so far as the form of the language will be moulded by the state of the culture, but not in so far as a certain state of the culture is conditioned by the morphological traits of the language."<sup>[27]</sup>

Boas' student Edward Sapir referred to the Humboldtian idea that languages were a major factor for understanding the cultural assumptions of peoples.<sup>[28]</sup> He espoused the opinion that because of the differences in the grammatical systems of languages no two languages were similar enough to allow for



Wilhelm von Humboldt



Franz Boas

perfect cross-translation. Sapir also thought because language represented reality differently, it followed that the speakers of different languages would perceive reality differently.

Sapir:

No two languages are ever sufficiently similar to be considered as representing the same social reality. The worlds in which different societies live are distinct worlds, not merely the same world with different labels attached.<sup>[29]</sup>



Edward Sapir

However, Sapir explicitly rejected strong linguistic determinism by stating, "It would be naïve to imagine that any analysis of experience is dependent on pattern expressed in language."<sup>[30]</sup>

Sapir was explicit that the associations between language and culture were neither extensive nor particularly profound, if they existed at all:

It is easy to show that language and culture are not intrinsically associated. Totally unrelated languages share in one culture; closely related languages—even a single language—belong to distinct culture spheres. There are many excellent examples in Aboriginal America. The Athabaskan languages form as clearly unified, as structurally specialized, a group as any that I know of. The speakers of these languages belong to four distinct culture areas... The cultural adaptability of the Athabaskan-speaking peoples is in the strangest contrast to the inaccessibility to foreign influences of the languages themselves.<sup>[31]</sup>

Sapir offered similar observations about speakers of so-called "world" or "modern" languages, noting, "possession of a common language is still and will continue to be a smoother of the way to a mutual understanding between England and America, but it is very clear that other factors, some of them rapidly cumulative, are working powerfully to counteract this leveling influence. A common language cannot indefinitely set the seal on a common culture when the geographical, physical, and economics determinants of the culture are no longer the same throughout the area."<sup>[32]</sup>

While Sapir never made a practice of studying directly how languages affected thought, some notion of (probably "weak") linguistic relativity affected his basic understanding of language, and would be developed by Whorf.<sup>[33]</sup>

## Independent developments in Europe

Drawing on influences such as Humboldt and Friedrich Nietzsche, some European thinkers developed ideas similar to those of Sapir and Whorf, generally working in isolation from each other. Prominent in Germany from the late 1920s through the 1960s were the strongly relativist theories of Leo Weisgerber and his concept of a 'linguistic inter-world', mediating between external reality and the forms of a given language, in ways peculiar to that language.<sup>[34]</sup> Russian psychologist Lev Vygotsky read Sapir's work and experimentally studied the ways in which the development of concepts in children was influenced by structures given in language. His 1934 work "*Thought and Language*"<sup>[35]</sup> has been compared to Whorf's

and taken as mutually supportive evidence of language's influence on cognition.<sup>[36]</sup> Drawing on Nietzsche's ideas of perspectivism Alfred Korzybski developed the theory of general semantics that has been compared to Whorf's notions of linguistic relativity.<sup>[37]</sup> Though influential in their own right, this work has not been influential in the debate on linguistic relativity, which has tended to be based on the American paradigm exemplified by Sapir and Whorf.

## Benjamin Lee Whorf

More than any linguist, Benjamin Lee Whorf has become associated with what he termed the "linguistic relativity principle".<sup>[38]</sup> Studying Native American languages, he attempted to account for the ways in which grammatical systems and language-use differences affected perception. Whorf's opinions regarding the nature of the relation between language and thought remain under contention. However, a version of theory holds some "merit", for example, "different words mean different things in different languages; not every word in every language has a one-to-one exact translation in a different language"<sup>[39]</sup> Critics such as Lenneberg,<sup>[40]</sup> Black, and Pinker<sup>[41]</sup> attribute to Whorf a strong linguistic determinism, while Lucy, Silverstein and Levinson point to Whorf's explicit rejections of determinism, and where he contends that translation and commensuration are possible.

Detractors such as Lenneberg,<sup>[40]</sup> Chomsky and Pinker<sup>[42]</sup> criticized him for insufficient clarity of his description of how language influences thought, and for not proving his conjectures. Most of his arguments were in the form of anecdotes and speculations that served as attempts to show how "exotic" grammatical traits were associated with what were apparently equally exotic worlds of thought. In Whorf's words:

We dissect nature along lines laid down by our native language. The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, the world is presented in a kaleidoscope flux of impressions which has to be organized by our minds—and this means largely by the linguistic systems of our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way—an agreement that holds throughout our speech community and is codified in the patterns of our language [...] all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated.<sup>[43]</sup>

## Several terms for a single concept

Among Whorf's best-known examples of linguistic relativity are instances where a non-European language has several terms for a concept that is only described with one word in European languages (Whorf used the acronym SAE "Standard Average European" to allude to the rather similar grammatical structures of the well-studied European languages in contrast to the greater diversity of less-studied languages).

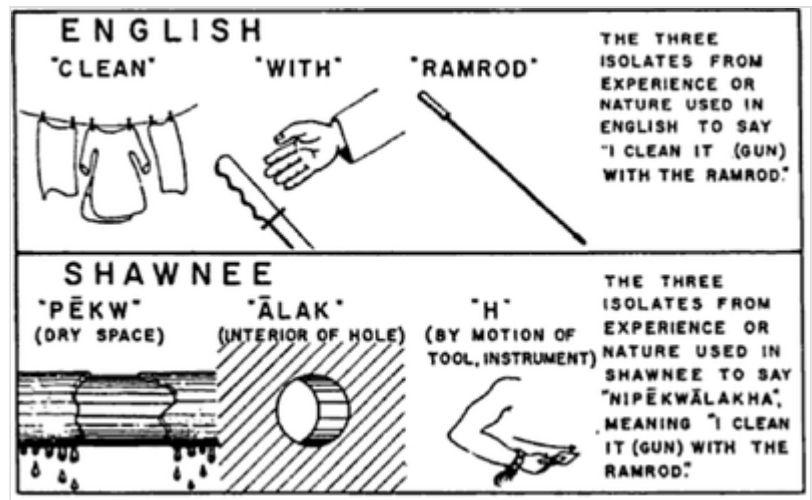
One of Whorf's examples was the supposedly large number of words for 'snow' in the Inuit languages, an example which later was contested as a misrepresentation.<sup>[44]</sup>

Another is the Hopi language's words for water, one indicating drinking water in a container and another indicating a natural body of water.<sup>[45]</sup>

These examples of polysemy served the double purpose of showing that non-European languages sometimes made more specific semantic distinctions than European languages and that direct translation between two languages, even of seemingly basic concepts such as snow or water, is not always possible.<sup>[46]</sup>

Another example is from Whorf's experience as a chemical engineer working for an insurance company as a fire inspector.<sup>[44]</sup> While inspecting a chemical plant he observed that the plant had two storage rooms for gasoline barrels, one for the full barrels and one for the empty ones. He

further noticed that while no employees smoked cigarettes in the room for full barrels, no-one minded smoking in the room with empty barrels, although this was potentially much more dangerous because of the flammable vapors still in the barrels. He concluded that the use of the word *empty* in association to the barrels had resulted in the workers unconsciously regarding them as harmless, although consciously they were probably aware of the risk of explosion. This example was later criticized by Lenneberg<sup>[40]</sup> as not actually demonstrating causality between the use of the word *empty* and the action of smoking, but instead was an example of circular reasoning. Pinker in *The Language Instinct* ridiculed this example, claiming that this was a failing of human insight rather than language.<sup>[42]</sup>



Whorf's illustration of the difference between the English and Shawnee gestalt construction of cleaning a gun with a ramrod. From the article "Science and Linguistics", originally published in the *MIT Technology Review*, 1940.

## Time in Hopi

Whorf's most elaborate argument for linguistic relativity regarded what he believed to be a fundamental difference in the understanding of time as a conceptual category among the Hopi.<sup>[47]</sup> He argued that in contrast to English and other SAE languages, Hopi does not treat the flow of time as a sequence of distinct, countable instances, like "three days" or "five years", but rather as a single process and that consequently it has no nouns referring to units of time as SAE speakers understand them. He proposed that this view of time was fundamental to Hopi culture and explained certain Hopi behavioral patterns.

Ekkehart Malotki later claimed that he had found no evidence of Whorf's claims in 1980's era Hopi speakers, nor in historical documents dating back to the arrival of Europeans. Malotki used evidence from archaeological data, calendars, historical documents, and modern speech; he concluded that there was no evidence that Hopi conceptualize time in the way Whorf suggested. Many universalist scholars such as Pinker consider Malotki's study as a final refutation of Whorf's claim about Hopi, whereas relativist scholars such as John A Lucy and Penny Lee criticized Malotki's study for mischaracterizing Whorf's claims and for forcing Hopi grammar into a model of analysis that does not fit the data.<sup>[48]</sup>

## Structure-centered approach

Whorf's argument about Hopi speakers' conceptualization of time is an example of the structure-centered method of research into linguistic relativity, which Lucy identified as one of three main types of research of the topic.<sup>[49]</sup> The "structure-centered" method starts with a language's structural peculiarity and examines its possible ramifications for thought and behavior. The defining example is Whorf's observation of discrepancies between the grammar of time expressions in Hopi and English. More recent research in this vein is Lucy's research describing how usage of the categories of grammatical number and of numeral classifiers in the Mayan language Yucatec result in Mayan speakers classifying objects according to material rather than to shape as preferred by English speakers.<sup>[50]</sup> However, philosophers including Donald Davidson and Jason Josephson Storm have argued that Whorf's Hopi examples are self-refuting, as Whorf had to translate Hopi terms into English in order to explain how they are untranslatable.<sup>[51]</sup>

## Whorf dies

Whorf died in 1941 at age 44, leaving multiple unpublished papers. His ideas were continued by linguists and anthropologists such as Hoijer and Lee, who both continued investigating the effect of language on habitual thought, and Trager, who prepared a number of Whorf's papers for posthumous publishing. The most important event for the dissemination of Whorf's ideas to a larger public was the publication in 1956 of his major writings on the topic of linguistic relativity in a single volume titled *Language, Thought and Reality*.

## Brown and Lenneberg

In 1953, Eric Lenneberg criticized Whorf's examples from an objectivist philosophy of language, claiming that languages are principally meant to represent events in the real world, and that even though languages express these ideas in various ways, the meanings of such expressions and therefore the thoughts of the speaker are equivalent. He argued that Whorf's English descriptions of a Hopi speaker's idea of time were in fact translations of the Hopi concept into English, therefore disproving linguistic relativity. However Whorf was concerned with how the habitual *use* of language influences habitual behavior, rather than translatability. Whorf's point was that while English speakers may be able to *understand* how a Hopi speaker thinks, they do not *think* in that way.<sup>[52]</sup>

Lenneberg's main criticism of Whorf's works was that he never showed the necessary association between a linguistic phenomenon and a mental phenomenon. With Brown, Lenneberg proposed that proving such an association required directly matching linguistic phenomena with behavior. They assessed linguistic relativity experimentally and published their findings in 1954. Since neither Sapir nor Whorf had ever stated a formal hypothesis, Brown and Lenneberg formulated their own. Their two tenets were (i) "the world is differently experienced and conceived in different linguistic communities" and (ii) "language causes a particular cognitive structure".<sup>[53]</sup> Brown later developed them into the so-called "weak" and "strong" formulation:

- Structural differences between language systems will, in general, be paralleled by nonlinguistic cognitive differences, of an unspecified sort, in the native speakers of the language.
- The structure of anyone's native language strongly influences or fully determines the worldview he will acquire as he learns the language.<sup>[54]</sup>

Brown's formulations became known widely and were retrospectively attributed to Whorf and Sapir although the second formulation, verging on linguistic determinism, was never advanced by either of them.

## Joshua Fishman's "Whorfianism of the third kind"

Joshua Fishman argued that Whorf's true assertion was largely overlooked. In 1978, he suggested that Whorf was a "neo-Herderian champion"<sup>[55]</sup> and in 1982, he proposed "Whorfianism of the third kind" in an attempt to reemphasize what he claimed was Whorf's real interest, namely the intrinsic value of "little peoples" and "little languages".<sup>[56]</sup> Whorf had criticized Ogden's Basic English thus:

But to restrict thinking to the patterns merely of English [...] is to lose a power of thought which, once lost, can never be regained. It is the 'plainest' English which contains the greatest number of unconscious assumptions about nature. [...] We handle even our plain English with much greater effect if we direct it from the vantage point of a multilingual awareness.<sup>[57]</sup>

Where Brown's weak version of the linguistic relativity hypothesis proposes that language *influences* thought and the strong version that language *determines* thought, Fishman's "Whorfianism of the third kind" proposes that language *is a key to culture*.

## Leiden school

The Leiden school is a linguistic theory that models languages as parasites. Notable proponent Frederik Kortlandt, in a 1985 paper outlining Leiden school theory, advocates for a form of linguistic relativity: "The observation that in all Yuman languages the word for 'work' is a loan from Spanish should be a major blow to any current economic theory." In the next paragraph, he quotes directly from Sapir: "Even in the most primitive cultures the strategic word is likely to be more powerful than the direct blow."<sup>[58]</sup>

## Rethinking Linguistic Relativity

The publication of the 1996 anthology *Rethinking Linguistic Relativity* edited by Gumperz and Levinson began a new period of linguistic relativity studies that emphasized cognitive and social aspects. The book included studies on linguistic relativity and universalist traditions. Levinson documented significant linguistic relativity effects in the different linguistic conceptualization of spatial categories in different languages. For example, men speaking the Guugu Yimithirr language in Queensland gave accurate navigation instructions using a compass-like system of north, south, east and west, along with a hand gesture pointing to the starting direction.<sup>[59]</sup>

Lucy defines this method as "domain-centered" because researchers select a semantic domain and compare it across linguistic and cultural groups.<sup>[49]</sup> Space is another semantic domain that has proven fruitful for linguistic relativity studies.<sup>[60]</sup> Spatial categories vary greatly across languages. Speakers rely on the linguistic conceptualization of space in performing many ordinary tasks. Levinson and others reported three basic spatial categorizations. While many languages use combinations of them, some languages exhibit only one type and related behaviors. For example, Yimithirr only uses absolute directions when describing spatial relations—the position of everything is described by using the cardinal directions. Speakers define a location as "north of the house", while an English speaker may use relative positions, saying "in front of the house" or "to the left of the house".<sup>[61]</sup>



Separate studies by Bowerman and Slobin analyzed the role of language in cognitive processes. Bowerman showed that certain cognitive processes did not use language to any significant extent and therefore could not be subject to linguistic relativity.<sup>[62]</sup> Slobin described another kind of cognitive process that he named "thinking for speaking"—the kind of process in which perceptual data and other kinds of prelinguistic cognition are translated into linguistic terms for communication. These, Slobin argues, are the kinds of cognitive process that are the basis of linguistic relativity.<sup>[63]</sup>

## Colour terminology

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### Brown and Lenneberg

Since Brown and Lenneberg believed that the objective reality denoted by language was the same for speakers of all languages, they decided to test how different languages codified the same message differently and whether differences in codification could be proven to affect behavior. Brown and Lenneberg designed experiments involving the codification of colors. In their first experiment, they investigated whether it was easier for speakers of English to remember color shades for which they had a specific name than to remember colors that were not as easily definable by words. This allowed them to compare the linguistic categorization directly to a non-linguistic task. In a later experiment, speakers of two languages that categorize colors differently (English and Zuni) were asked to recognize colors. In this manner, it could be determined whether the differing color categories of the two speakers would determine their ability to recognize nuances within color categories. Brown and Lenneberg found that Zuni speakers who classify green and blue together as a single color did have trouble recognizing and remembering nuances within the green/blue category.<sup>[64]</sup> This method, which Lucy later classified as domain-centered,<sup>[49]</sup> is acknowledged to be sub-optimal, because color perception, unlike other semantic domains, is hardwired into the neural system and as such is subject to more universal restrictions than other semantic domains.

### Hugo Magnus

In a similar study done by German ophthalmologist Hugo Magnus during the 1870s, he circulated a questionnaire to missionaries and traders with ten standardized color samples and instructions for using them. These instructions contained an explicit warning that failure of a language to distinguish lexically between two colors did not necessarily imply that speakers of that language did not distinguish the two colors perceptually. Magnus received completed questionnaires on twenty-five African, fifteen Asian, three Australian, and two European languages. He concluded in part, "As regards the range of the color sense of the primitive peoples tested with our questionnaire, it appears in general to remain within the same bounds as the color sense of the civilized nations. At least, we could not establish a complete lack of the perception of the so-called main colors as a special racial characteristic of any one of the tribes investigated for us. We consider red, yellow, green, and blue as the main representatives of the colors of long and short wavelength; among the tribes we tested not a one lacks the knowledge of any of these four

colors" (Magnus 1880, p. 6, as trans. in Berlin and Kay 1969, p. 141). Magnus did find widespread lexical neutralization of green and blue, that is, a single word covering both these colors, as have all subsequent comparative studies of color lexicons.<sup>[65]</sup>

## Response to Brown and Lenneberg's study

Brown and Lenneberg's study began a tradition of investigation of linguistic relativity through color terminology. The studies showed a correlation between color term numbers and ease of recall in both Zuni and English speakers. Researchers attributed this to focal colors having greater codability than less focal colors, and not with linguistic relativity effects. Berlin/Kay found universal typological color principles that are determined by biological rather than linguistic factors.<sup>[66]</sup> This study sparked studies into typological universals of color terminology. Researchers such as Lucy,<sup>[49]</sup> Saunders<sup>[67]</sup> and Levinson<sup>[68]</sup> argued that Berlin and Kay's study does not refute linguistic relativity in color naming, because of unsupported assumptions in their study (such as whether all cultures in fact have a clearly defined category of "color") and because of related data problems. Researchers such as MacLaury continued investigation into color naming. Like Berlin and Kay, MacLaury concluded that the domain is governed mostly by physical-biological universals.<sup>[69][70]</sup>

## Berlin and Kay

Studies by Berlin and Kay continued Lenneberg's color research. They studied color terminology formation and showed clear universal trends in color naming. For example, they found that even though languages have different color terminologies, they generally recognize certain hues as more focal than others. They showed that in languages with few color terms, it is predictable from the number of terms which hues are chosen as focal colors, for example, languages with only three color terms always have the focal colors black, white and red.<sup>[66]</sup> The fact that what had been believed to be random differences between color naming in different languages could be shown to follow universal patterns was seen as a powerful argument against linguistic relativity.<sup>[71]</sup> Berlin and Kay's research has since been criticized by relativists such as Lucy, who argued that Berlin and Kay's conclusions were skewed by their insistence that color terms encode only color information.<sup>[72]</sup> This, Lucy argues, made them unaware of the instances in which color terms provided other information that might be considered examples of linguistic relativity.

## Universalism

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Universalist scholars began a period of dissent from ideas about linguistic relativity. Lenneberg was one of the first cognitive scientists to begin development of the Universalist theory of language that was formulated by Chomsky as universal grammar, effectively arguing that all languages share the same underlying structure. The Chomskyan school also includes the belief that linguistic structures are largely innate and that what are perceived as differences between specific languages are surface phenomena that do not affect the brain's universal cognitive processes. This theory became the dominant paradigm of American linguistics from the 1960s through the 1980s, while linguistic relativity became the object of ridicule.<sup>[73]</sup>

## Ekkehart Malotki

Other universalist researchers dedicated themselves to dispelling other aspects of linguistic relativity, often attacking Whorf's specific examples. For example, Malotki's monumental study of time expressions in Hopi presented many examples that challenged Whorf's "timeless" interpretation of Hopi language and culture,<sup>[74]</sup> but seemingly failed to address the linguistic relativist argument actually posed by Whorf (i.e. that the understanding of time by native Hopi speakers differed from that of speakers of European languages due to the differences in the organization and construction of their respective languages; Whorf never claimed that Hopi speakers lacked any concept of time).<sup>[75]</sup> Malotki himself acknowledges that the conceptualizations are different, but because he ignores Whorf's use of quotes around the word "time" and the qualifier "what we call", takes Whorf to be arguing that the Hopi have no concept of time at all.<sup>[76][77][78]</sup>

## Steven Pinker

Currently many believers of the universalist school of thought still oppose linguistic relativity. For example, Pinker argues in *The Language Instinct* that thought is independent of language, that language is itself meaningless in any fundamental way to human thought, and that human beings do not even think in "natural" language, i.e. any language that we actually communicate in; rather, we think in a meta-language, preceding any natural language, termed "mentalese". Pinker attacks what he terms "Whorf's radical position", declaring, "the more you examine Whorf's arguments, the less sense they make".<sup>[42]</sup>

Pinker and other universalists have been accused by relativists of misrepresenting Whorf's ideas and committing the Strawman fallacy.<sup>[79][72][52]</sup>

## Cognitive linguistics

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During the late 1980s and early 1990s, advances in cognitive psychology and cognitive linguistics renewed interest in the Sapir–Whorf hypothesis.<sup>[80]</sup> One of those who adopted a more Whorfian philosophy was George Lakoff. He argued that language is often used metaphorically and that languages use different cultural metaphors that reveal something about how speakers of that language think. For example, English employs conceptual metaphors likening time to money, so that time can be saved and spent and invested, whereas other languages do not talk about time in that manner. Other such metaphors are common to many languages because they are based on general human experience, for example, metaphors associating *up* with *good* and *bad* with *down*. Lakoff also argued that metaphor plays an important part in political debates such as the "right to life" or the "right to choose"; or "illegal aliens" or "undocumented workers".<sup>[81]</sup>

An unpublished study by Boroditsky et al. in 2003 reported to have found empirical evidence favoring the hypothesis demonstrating that differences in the grammatical gender systems of languages can affect the way speakers of those languages think about objects. Speakers of Spanish and German, which have different gender systems, were asked to use adjectives to describe various objects that were either masculine or feminine in their respective languages. They reported that speakers tended to describe objects in ways that were consistent with the gender of the noun in their language, indicating that the gender system of a language can influence speakers' perceptions of objects. Despite numerous citations, the experiment was criticised after the reported effects could not be replicated by independent trials.<sup>[82][83]</sup> Additionally, a large-scale data analysis using word embeddings of language models found

no correlation between adjectives and inanimate noun genders,<sup>[84]</sup> while another study using large text corpora found a slight correlation between the gender of animate and inanimate nouns and their adjectives as well as verbs by measuring their mutual information.<sup>[85]</sup>

## Parameters

In his book *Women, Fire and Dangerous Things: What Categories Reveal About the Mind*,<sup>[52]</sup> Lakoff reappraised linguistic relativity and especially Whorf's ideas about how linguistic categorization represents and/or influences mental categories. He concluded that the debate had been confused. He described four parameters on which researchers differed in their opinions about what constitutes linguistic relativity:

- The degree and intensity of linguistic relativity. Perhaps a few examples of superficial differences in language and associated behavior are enough to demonstrate the existence of linguistic relativity. Alternatively, perhaps only great differences that permeate the linguistic and cultural system suffice.
- Whether conceptual systems are absolute or whether they can evolve.
- Whether the similarity criterion is translatability or the use of linguistic expressions.
- Whether the emphasis of linguistic relativity is language or the brain.

Lakoff concluded that many of Whorf's critics had criticized him using novel definitions of linguistic relativity, rendering their criticisms moot.

## Refinements

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Researchers such as Boroditsky, Choi, Majid, Lucy and Levinson believe that language influences thought in more limited ways than the broadest early claims. Researchers examine the interface between thought (or cognition), language and culture and describe the relevant influences. They use experimental data to back up their conclusions.<sup>[86][87]</sup> Kay ultimately concluded that "[the] Whorf hypothesis is supported in the right visual field but not the left".<sup>[88]</sup> His findings show that accounting for brain lateralization offers another perspective.

## Behavior-centered research

Recent studies have also used a "behavior-based" method, which starts by comparing behavior across linguistic groups and then searches for causes for that behavior in the linguistic system.<sup>[49]</sup> In an early example of this method, Whorf attributed the occurrence of fires at a chemical plant to the workers' use of the word 'empty' to describe barrels containing only explosive vapors.

More recently, Bloom noticed that speakers of Chinese had unexpected difficulties answering counterfactual questions posed to them in a questionnaire. He concluded that this was related to the way in which counter-factuality is marked grammatically in Chinese. Other researchers attributed this result to Bloom's flawed translations.<sup>[89]</sup> Strømnes examined why Finnish factories had a greater occurrence of work related accidents than similar Swedish ones. He concluded that cognitive differences between the

grammatical usage of Swedish prepositions and Finnish cases could have caused Swedish factories to pay more attention to the work process while Finnish factory organizers paid more attention to the individual worker.<sup>[90]</sup>

## Everett on Pirahã

Everett's work on the Pirahã language of the Brazilian Amazon<sup>[91]</sup> found several peculiarities that he interpreted as corresponding to linguistically rare features, such as a lack of numbers and color terms in the way those are otherwise defined and the absence of certain types of clauses. Everett's conclusions were met with skepticism from universalists<sup>[92]</sup> who claimed that the linguistic deficit is explained by the lack of need for such concepts.<sup>[93]</sup>

## Mandarin and Thai

Recent research with non-linguistic experiments in languages with different grammatical properties (e.g., languages with and without numeral classifiers or with different gender grammar systems) showed that language differences in human categorization are due to such differences.<sup>[94]</sup> Experimental research suggests that this linguistic influence on thought diminishes over time, as when speakers of one language are exposed to another.<sup>[95]</sup>

## Swedish and Spanish

A study published by the American Psychological Association's Journal of Experimental Psychology claimed that language can influence how one estimates time. The study considered three groups: those who spoke only Swedish, those who spoke only Spanish and bilingual speakers who spoke both of those languages. Swedish speakers describe time using distance terms like "long" or "short" while Spanish speakers do it using quantity related terms like "much" or "little". The researchers asked the participants to estimate how much time had passed while watching a line growing across a screen, or a container being filled, or both. The researchers stated that "When reproducing duration, Swedish speakers were misled by stimulus length, and Spanish speakers were misled by stimulus size/quantity." When the bilinguals were prompted with the word *duración* (the Spanish word for duration) they based their time estimates of how full the containers were, ignoring the growing lines. When prompted with the word *tid* (the Swedish word for duration), they estimated the time elapsed solely by the distance the lines had traveled.<sup>[96][97]</sup>

## Pronoun-dropping

Kashima & Kashima observed a correlation between the perceived individualism or collectivism in the social norms of a given country, with the tendency to neglect the use of pronouns in the country's language. They argued that explicit reference to "you" and "I" reinforces a distinction between the self and the other in the speaker.<sup>[98]</sup>

## Future tense

A 2013 study found that those who speak "futureless" languages with no grammatical marking of the future tense save more, retire with more wealth, smoke less, practice safer sex, and are less obese than those who do not.<sup>[99]</sup> This effect has come to be termed the linguistic-savings hypothesis and has been replicated in several cross-cultural and cross-country studies. However, a study of Chinese, which can be

spoken both with and without the grammatical future marking "will", found that subjects do not behave more impatiently when "will" is used repetitively. This laboratory-based finding of elective variation within a single language does not refute the linguistic savings hypothesis but some have suggested that it shows the effect may be due to culture or other non-linguistic factors.<sup>[100]</sup>

## Psycholinguistic research

Psycholinguistic studies explored motion perception, emotion perception, object representation and memory.<sup>[101][102][103][104]</sup> The gold standard of psycholinguistic studies on linguistic relativity is now finding non-linguistic cognitive differences in speakers of different languages (thus rendering inapplicable Pinker's criticism that linguistic relativity is "circular").

Recent work with bilingual speakers attempts to distinguish the effects of language from those of culture on bilingual cognition including perceptions of time, space, motion, colors and emotion.<sup>[105]</sup> Researchers described differences between bilinguals and monolinguals in perception of color,<sup>[106]</sup> representations of time<sup>[107]</sup> and other elements of cognition.

One experiment found that speakers of languages without numbers greater than two had difficulty counting the number of taps, for example, making more errors distinguishing between six and seven taps.<sup>[108]</sup> Presumably this is because they could not count the taps using numbers repeated in the phonological loop.

## Other domains

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Linguistic relativity inspired others to consider whether thought and emotion could be influenced by manipulating language.

## Science and philosophy

The question bears on philosophical, psychological, linguistic and anthropological questions.

A major question is whether human psychological faculties are mostly innate or whether they are mostly a result of learning, and hence subject to cultural and social processes such as language. The innate opinion is that humans share the same set of basic faculties, and that variability due to cultural differences is less important and that the human mind is a mostly biological construction, so that all humans sharing the same neurological configuration can be expected to have similar cognitive patterns.

Multiple alternatives have advocates. The contrary constructivist position holds that human faculties and concepts are largely influenced by socially constructed and learned categories, without many biological restrictions. Another variant is idealist, which holds that human mental capacities are generally unrestricted by biological-material structures. Another is essentialist, which holds that essential differences may influence the ways individuals or groups experience and conceptualize the world. Yet another is relativist (cultural relativism), which sees different cultural groups as employing different conceptual schemes that are not necessarily compatible or commensurable, nor more or less in accord with external reality.<sup>[109]</sup>

Another debate considers whether thought is a type of internal speech or is independent of and prior to language.<sup>[110]</sup>

In the philosophy of language the question addresses the relations between language, knowledge and the external world, and the concept of truth. Philosophers such as Putnam, Fodor, Davidson, and Dennett see language as representing directly entities from the objective world and that categorization reflect that world. Other philosophers (e.g. Quine, Searle, and Foucault) argue that categorization and conceptualization is subjective and arbitrary. Another view, represented by Storm, seeks a third way by emphasizing how language changes and imperfectly represents reality without being completely divorced from ontology.<sup>[111]</sup>

Another question is whether language is a tool for representing and referring to objects in the world, or whether it is a system used to construct mental representations that can be communicated.

## Therapy and self-development

Sapir/Whorf contemporary Alfred Korzybski was independently developing his theory of general semantics, which was intended to use language's influence of thinking to maximize human cognitive abilities. Korzybski's thinking was influenced by logical philosophy such as Russell and Whitehead's Principia Mathematica and Wittgenstein's Tractatus Logico-Philosophicus.<sup>[112]</sup> Although Korzybski was not aware of Sapir and Whorf's writings, the philosophy was adopted by Whorf-admirer Stuart Chase, who fused Whorf's interest in cultural-linguistic variation with Korzybski's programme in his popular work "*The Tyranny of Words*". S. I. Hayakawa was a follower and popularizer of Korzybski's work, writing *Language in Thought and Action*. The general semantics philosophy influenced the development of neuro-linguistic programming (NLP), another therapeutic technique that seeks to use awareness of language use to influence cognitive patterns.<sup>[113]</sup>

Korzybski independently described a "strong" version of the hypothesis of linguistic relativity.<sup>[114]</sup>

We do not realize what tremendous power the structure of an habitual language has. It is not an exaggeration to say that it enslaves us through the mechanism of s[emantic] r[eactions] and that the structure which a language exhibits, and impresses upon us unconsciously, is automatically projected upon the world around us.

—Korzybski (1930)<sup>[115]</sup>

## Artificial languages

In their fiction, authors such as Ayn Rand and George Orwell explored how linguistic relativity might be exploited for political purposes. In Rand's *Anthem*, a fictive communist society removed the possibility of individualism by removing the word "I" from the language.<sup>[116]</sup> In Orwell's *1984* the authoritarian state created the language Newspeak to make it impossible for people to think critically about the government, or even to contemplate that they might be impoverished or oppressed, by reducing the number of words to reduce the thought of the locutor.<sup>[117]</sup>

Others have been fascinated by the possibilities of creating new languages that could enable new, and perhaps better, ways of thinking. Examples of such languages designed to explore the human mind include Loglan, explicitly designed by James Cooke Brown to test the linguistic relativity hypothesis, by

experimenting whether it would make its speakers think more logically. Suzette Haden Elgin, who was involved with the early development of neuro-linguistic programming, invented the language Láadan to explore linguistic relativity by making it easier to express what Elgin considered the female worldview, as opposed to Standard Average European languages which she considered to convey a "male centered" worldview.<sup>[118]</sup> John Quijada's language Ithkuil was designed to explore the limits of the number of cognitive categories a language can keep its speakers aware of at once.<sup>[119]</sup> Similarly, Sonja Lang's Toki Pona was developed according to a Taoist philosophy for exploring how (or if) such a language would direct human thought.<sup>[120]</sup>

## Programming languages

APL programming language originator Kenneth E. Iverson believed that the Sapir–Whorf hypothesis applied to computer languages (without actually mentioning it by name). His Turing Award lecture, "Notation as a Tool of Thought", was devoted to this theme, arguing that more powerful notations aided thinking about computer algorithms.<sup>[121][122]</sup>

The essays of Paul Graham explore similar themes, such as a conceptual hierarchy of computer languages, with more expressive and succinct languages at the top. Thus, the so-called *blub* paradox (after a hypothetical programming language of average complexity called *Blub*) says that anyone preferentially using some particular programming language will *know* that it is more powerful than some, but not that it is less powerful than others. The reason is that *writing* in some language means *thinking* in that language. Hence the paradox, because typically programmers are "satisfied with whatever language they happen to use, because it dictates the way they think about programs".<sup>[123]</sup>

In a 2003 presentation at an open source convention, Yukihiro Matsumoto, creator of the programming language Ruby, said that one of his inspirations for developing the language was the science fiction novel Babel-17, based on the Whorf Hypothesis.<sup>[124]</sup>

## Science fiction

Numerous examples of linguistic relativity have appeared in science fiction.

- The totalitarian regime depicted in George Orwell's 1949 novel *Nineteen Eighty Four* in effect acts on the basis of the Whorf hypothesis, seeking to replace English with Newspeak, a language constructed specifically with the intention that thoughts subversive of the regime cannot be expressed in it, and therefore people educated to speak and think in it would not have such thoughts.
- In his 1958 science fiction novel *The Languages of Pao* the author Jack Vance describes how specialized languages are a major part of a strategy to create specific classes in a society, to enable the population to withstand occupation and develop itself.
- In Samuel R. Delany's 1966 science fiction novel, *Babel-17*, the author describes an advanced, information-dense language that can be used as a weapon. Learning it turns one into an unwilling traitor as it alters perception and thought.<sup>[125]</sup>
- Ted Chiang's 1998 short story "Story of Your Life" developed the concept of the Whorf hypothesis as applied to an alien species which visits Earth. The aliens' biology contributes to their spoken and written languages, which are distinct. In the 2016 American movie *Arrival*, based on Chiang's short story, the Whorf hypothesis is the premise. The protagonist explains that "the Sapir–Whorf hypothesis is the theory that the language you speak determines how you think".<sup>[126]</sup>



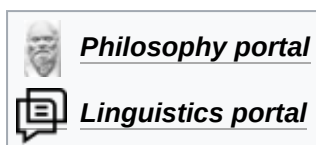
- Gene Wolfe's four volume science fiction novel *The Book of the New Sun* describes the North American "Ascian" people as speaking a language composed entirely of quotations that have been approved by a small ruling class.

## Sociolinguistics and linguistic relativity

The manner in which sociolinguistics<sup>[127]</sup> plays a role in variables within language, like the manner in which words are pronounced, word selection in certain dialogue, context, and tone, suggests it may have implications for linguistic relativity.

## See also

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- A rose by any other name would smell as sweet – Idiom, quotation from Romeo and Juliet
- *Basic Color Terms: Their Universality and Evolution* – Linguistics book by Brent Berlin and Paul Kay
- Bicameral mentality – Hypothesis in psychology
- Eskimo words for snow – Linguistic cliché
- Ethnolinguistics – Academic discipline
- Hopi time controversy – Academic debate about conceptualization of time in Hopi language
- Hypocognition – Inability to communicate due to no words for a concept
- Inherently funny words – Words which have been described as inherently funny
- Labeling theory – Labeling people changes their behavior
- Language and thought – Study of how language influences thought
- Language planning – Deliberate effort to influence languages or their varieties within a speech community
- Linguistic anthropology – Study of how language influences social life
- Linguistic determinism – Idea that language limits human thought
- Logocracy – Form of government by use of words
- Psycholinguistics – Study of relations between psychology and language
- Relativism – Philosophical view rejecting objectivity
- Terministic screen – Term in the theory and criticism of rhetoric

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