Linguistic Relativism

Variants and Misconceptions

Wouter Beek, wbeek@science.uva.nl

Contents

1. Introduction

Linguistic relativism is the idea that the language a person speaks has an influence on this person's cognition. This same idea, but with the added requirement of adherence to the method of empirical validation, is often termed the 'Sapir-Whorf hypothesis'. It is a frequently mentioned topic in such disparate research fields as cognitive psychology, philosophy of language, anthropology, linguistics and artificial intelligence. But even though the Sapir-Whorf hypothesis has been one of the most often mentioned ideas in all of the social and behavioral sciences, its validity is still being disputed. Some researchers claim the hypothesis to be trivially true, while others claim that it has been refuted. The Sapir-Whorf hypothesis (or linguistic relativism in general) is often treated within a larger constellation of ideas. For example linguistic feminism claims that inequalities in the grammatical structure of gender enforce the subordination of women, thus assuming the principle of linguistic relativity to be true. In the tradition of cognitive science, on the other hand, it is often assumed that certain universal categories underlie all human thought and researchers in this tradition thus seek to negate the principle of linguistic relativism, which would, when true, imply the existence of cross-cultural differences in thought. An objective overview of the topic should therefore be concerned with the principle of linguistic relativity alone, and not in the light of some overarching theory. Such an overview will show the various misconceptions that have surfaced through the years and will provide a model that is based on all of the available research – and not just a specifically chosen subset of it – in order to guide future research. For this overview to be established, three steps will be taken in this article.

First the Sapir-Whorf hypothesis is placed within its historical context. It then becomes clear that it is just one of many forms of that larger line of thought called linguistic relativism that is older than the work of Boas (which is often considered as the starting point of linguistic relativism) and goes back to the 18th century, whereas mention of the Sapir-Whorf hypothesis only started in the 1950's. The original sources – and early comments on these sources – are discussed, thereby illustrating how the various misconceptions that we find in current research often go back to early misconceptions that have sustained through the years.

Second, the empirical findings, both past and present, must be evaluated. What is especially important in estimating these research results, is to derive at a general model that encompasses all these results and moreover sufficiently explains why some researches assert, whereas other researches negate the principle of linguistic relativism. Only then will the case be elucidated as to which variants of linguistic relativity have been proven, which variants have been refuted, and which variants are still open to discussion. It will be clear at the end of this exposition that some forms of linguistic relativity are indeed invalidated (and thus proven to be untenable), whereas some forms of linguistic relativity are validated.

Third, the theoretical side of the matter needs to be tidied up. The anecdotes and examples that have driven the field for many decades now (and that have accompanied generations of academic students in the various fields involved) are put under close inspection. Not only is it important to find out whether these anecdotes and examples are in themselves valid or not or whether they provide sufficient evidence or not. It is equally important to establish whether the falsity or undecidability of such anecdotes and examples provides sufficient grounds for

invalidating the principle of linguistic relativity as a whole. Furthermore the distinction, as is mostly used, between a weak and a strong variant of the Sapir-Whorf hypothesis, will be shown to be insufficient to resolve the findings of recent research as well as being insufficient to guide future research into this topic in an oriented way. A new division is therefore proposed, at the same time taking a more general stand, in which the various forms of the Sapir-Whorf hypothesis are incorporated under the more general heading of 'linguistic relativism'.

It is my opinion that such a thorough look will shed light on this matter.

1.1 The principle of linguistic relativity, stated as general as possible

Now before we can focus on the history of linguistic relativism and the various experiments that have been undertaken, we will first have to provide a tentative definition of the idea of linguistic relativity. I will use the definition of the principle of linguistic relativity as stated by Stokhof, both for its clearness and compactness.[1] The definition consists of the following two characteristics:

1. **Fundamental differences between languages exist.**
2. **The language spoken by a person has an active influence of that person's world view.**

The above definition is of course only a very general outline of the problem. It provides the general framework wherein all lines of thought that we would like to think of as pertaining to the general idea of linguistic relativism can be fitted in a certain way. In addition to this rudimentary framework we define a small set of variables whose values may be altered in order to derive at a specific view of linguistic relativism. We can instantiate such a specific view by changing the various variables that are left unspecified in the above characterization. Let us first enumerate those variables, so that we may use them in the further discussion to characterize the various positions that are being taken by the respective thinkers and researchers within the tradition of linguistic relativism.

A formal description seems uselessly intricate, for the thought that a certain person at a certain point in time may have is, naturally, dependent on the characteristics of this person, his or her history and the specific characteristics of the situation in which he or she finds him/herself. The function may thus become ludicrously complex.

- **The strength of influence.** Language may have a *weak* influence on a person's world view, only affecting his or her *performance*, or language may have a *strong* influence on a person's world view (often the word 'determine' is used to characterize this strong influence), also affecting the person's *competence*.

  With 'competence' I mean the possibility of producing a certain thought. The competence of a speaker may thus be specified by a set of thoughts. When it comes to competence there is no such thing as a probability measure: a thought or way of perceiving either is within the set or it isn't.

1 Stokhof states these two principles in the Dutch text as follows:
"De opvatting van het linguïstisch relativisme wordt gekenmerkt door twee uitgangspunten. Het eerste is dat de taal die wij spreken actief ons beeld van de werkelijkheid beïnvloedt. En het tweede is dat talen of taalfamilies onderling op fundamentele wijze verschillen." [Stokhof2003, p. 160]

With 'performance' I mean the practical use of perception and thought in habitual thought. The performance of a person may be characterized as a ranking of the thoughts that are within the competence set of a speaker. This ranking is determined by the *applicability value* that is assigned to each thought in the competence set. This applicability value is some number on some scale signifying the probability of having a certain thought.

- **The scope of the influence** is likewise left unspecified in the above characterisation of linguistic relativism. The influence of language on thought may be restricted to only some relatively isolated parts of thought, but it may also be extended towards the whole of thought. It is important to note that even if we take the scope of influence of language upon thought to be very small, i.e. regarding only some minor area of the cognitive apparatus, we are still dealing with a certain form of linguistic relativity.
- **The world view** may incorporate both *perception* and *thinking*. It may further incorporate any of the various thought processes in the brain or a collection of them or all of them (as is specified by the afore mentioned scope of influence).

The purpose of defining the principle of linguistic relativity in such a general manner is that we can under this heading incorporate the various thinkers who have devoted their attention to the question at hand. We there define the problem we are dealing with according to the subject matter and not according to methodological differences, as is the case in the often used Sapir-Whorf hypothesis that – as will be shown – is only applicable to the research since the 1950's. Definition the problem as the Sapir-Whorf hypothesis would have required to leave out such prominent thinkers within the field as Herder, Hamann, Wilhelm von Humboldt[2], Boas, Sapir and Whorf.

2 Throughout the paper I will refer to Wilhelm von Humboldt by just 'Humboldt', thereby not producing any mistaken substitution with his brother Alexander von Humboldt, who will not be discussed in this paper.

2. Linguistic relativism until Whorf

2.1 The conception of language and thought in the Enlightenment

Linguistic relativism is a relatively new concept, it did not exist in the Enlightenment. It was posed for the first time, as will be treated below, in the Romantic era by Hamann and Herder, and later by Humboldt. But before we consider these early relativistic views, we shall first give a short overview of the prevalent ideas concerning language and thought, that were prevalent in the Enlightenment period.

In the Enlightenment thought and language were seen as two distinct processes, whereby the first was seen as the complete master over the second. Ideas were composed in the mind. Such composition was conceived of as being solely dependent on the inner logic of thought, and considered independent of language. The categories and processes of thought were considered universal to all human beings. In this scheme, language was seen as a means of communication only. The ideas that the mind had come up with – through the application of universal categories and processes – were couched in words in order to express them. The apparent differences between languages were scarcely mentioned, the knowledge of languages not belonging to the Indo-European lineage being minimal. If certain differences among languages were observed, they were seen as either slight aberrations upon a common theme of universals (this was the case for European languages), or the deviating languages were seen as being of a less developed sort (this was the case for non-European languages). Language was in the Enlightenment thus seen as secondary to thought when it comes to the formulation of one's ideas. A similar view was often held with respect to the origin of language. Language would thus have been brought about by a convention established between human beings. First there was thought, and out of thought arose language. In the famous work of Locke, *An Essay Concerning Human Understanding*, we read:

> "The comfort and advantage of society not being to be had without communication of thoughts, it was necessary that man should find out some external visible signs, whereof those invisible ideas, which his thoughts are made up of, might be made known to others." [Locke1689, Volume 2, Book 3, Chapter 2, Section 1.]

This view of language as being created by man, was itself a progressive idea at the time, conflicting with the then common doctrine of the Catholic Church, which stated that language was invented by God and given to man. Even though the orthodox view, as expressed in Genesis[3], is in accordance with the first property of linguistic relativism (similarly claiming that languages differ fundamentally), it did not give rise to a theory of linguistic relativism. It is here only mentioned for completeness' sake, since it remained an important alternative view, besides the rationalistic and – later – the romantic view until well into the 18th century (and in non-scientific thinking lingers even today).

This view of the independence of thought with respect to language, and the view of language as an unproblematic communication device only, was common ground for the otherwise so antagonistic points of view of empiricism and rationalism. The superiority of thought to language was exemplified in ideas to improve language through rational principles, as was espoused by Leibnitz in *Unvorgreifliche Gedanken, betreffend die Ausübung und Verbesserung der deutschen Sprache* (1697).

3 Genesis, Chapter 10, Verse 6-9.

The most important work, proclaiming the universality of grammar, was the French Port Royal grammar of Lancelot and Arnauld. Their grammar was published in 1660[4] and remained the principal source for grammar research for over 200 years, and after a period in which only little attention had been paid to it in the first half of the 20th century, its popularity was revived by Chomsky (who considered the work of Lancelot and Arnauld as in line with his own research, as explained in *Cartesian Linguistics*[5]).

2.2 Hamann and Herder, the Romantic period

As we have seen, the conception of the origin of language was in the enlightenment based on rationality, involving the establishing of a convention facilitating the expression of independently construed thoughts. The change in the conception of the origin of language can be seen as parallel to changing conceptions regarding literature. Whereas in the enlightenment literature was conceived of as reflecting reality, in the subsequent Romantic period the literary use of language was seen as expressing the emotions of the individual poet. In accordance with this change of ideas in literary thought, the ideas on the origin of language changed as well. It was now thought that language had originated from the expressing of emotions, rather than being based on rational agreement. This idea had already been expressed by forerunners of Romanticism like Blackwell in his 1735 work *An Enquiry Into the Life and Writings of Homer*, and thereafter maintained by Monboddo, Rousseau and Vico. These writings had an impact on Hamann's 1762 work *Kreuzzüge des Philologen*[6]. This work was a frontal attack upon the prevalent ideas on language held in the Enlightenment period. In his work the various ingredients of linguistic relativism can all be found: he states that while some similarities among languages can be found, there are also differences. And those differences among languages parallel differences in thought. Language did not originate from thought, but its origin had been prior to thought, for thought presupposes a language in which it might manifest itself. Hamann may thus be seen as the first one to hold such relativistic views in a strongly articulated fashion.

Hamann's work had a thorough influence upon Herder, as is apparent from the latter's 1772 prize winning essay *Abhandlung über den Ursprung der Sprache*[7]. Herder's essay answered the question posed by the Berlin Academy, who intended to resolve the question whether language had a human/rational or a divine origin. Herder however did not favour either of these options, but refuted both and instead introduced the emotional variant that was not very common at the time. The opening sentence of the first section is already quite suggestive:

> "*Schon als Tier hat der Mensch Sprache*. Alle heftigen und die heftigsten unter den heftigen, die schmerzhaften Empfindungen seines Körpers, alle starke Leidenschaften seiner Seele äußern sich unmittelbar in Geschrei, in Töne, in wilde, unartikulierte Laute." [Herder1772, erster Teil, erster Abschnitt]

This work was widely influential; together with that of the before mentioned authors, it changed the way in which researchers thought about the origin of language. By providing an alternative to the rationalistic variant, the emotional variant questioned

4 Arnauld&Lancelot1660.
5 Chomsky1966.
6 Hamann1762.
7 Herder1772.

the primacy of thought to language. Now other constellations became possible (language preceding thought or language and thought originating at the same time) and thus the discussion of linguistic relativity was opened.

Herders' concept of linguistic relativity was fitted into a much broader anti-rational framework, questioning the traditional conception of the universality of reason, and instead opting for individual spontaneity as the main source of thought. Herder thus maintained there being a wide variety of different intellectual societies. The importance of language within this constellation is that it is the primary source through which one can observe these various societies. In his critique on Kant[8] he elaborated upon this topic. He therein opted that language is the necessary medium for thought to be exercised, a statement that had also been present in the work of Hamann. Herder however takes an even more radical stance by asserting that thought itself is internalised language, thus equating language and thought.

One of the researchers being influenced by Hamann and Herder was Humboldt. He sought to elaborate their ideas, as will be explained in the next section.

2.3 Humboldt's conception of linguistic relativism

In the works of Hamann and Herder there had been no extensive study of different languages. The views of Hamann were mere opinions based on intuition and not in the least backed by a sufficient study of language differences. The views of Herder were based on a shallow understanding of language diversity, many of his sources being unreliable, and his stance was more molded into his larger theory of spontaneity then it was fitting the facts. The field of comparative linguistics did at the time not exist, so reliable and systematic information was scarce. Their stances did nonetheless inspire Humboldt to hold a similar standpoint on the matter. Humboldt however revitalised the discussion by basing the various relativistic claims upon a broad range of evidence from various non-western languages. He was therefore the first one who sought to provide an extensive body of evidence regarding the principle of linguistic relativity. Humboldt combined the knowledge from the then emerging field of comparative linguistics, of which he was one of the originators, with the earlier statements concerning linguistic relativity that had been put forward by Hamann and Herder. He thereby showed that the claim that fundamental differences between languages do exist was substantiated by empirical evidence.

Humboldt is often considered to have maintained what would later come to be known as the strong version of linguistic relativism. He however never states explicitly that he considered language and thought to be equivalent in the strict logical sense, so care should be exercised in the attribution of the strongest version of relativism to him. But he surely saw the two components as strongly related and at least maintained a view of relativism that comes very close to total equivalence:

> "Sie [= die intellectuelle Tätigkeit] und die Sprache sind daher Eins und unzertrennlich von einander." [Humboldt1841, Band VI, p. 51]

The visions of Humboldt are however to a large extent incoherent; he often even expresses entirely contradicting opinions in different works. These contradictions in his work are explained by Brown[9] as to originate from the contradictory doctrines of Humboldt's precursors. Humboldt was in many respects a scholar on crossroads. He

8 This is: **Herder, J.G. 1799.** *Vestand und Erfahrung. Eine Metakritik zur Kritik der reinen Vernunft.* Leipzig: Johan Friedrich Hartnoch.

9 Brown1967.

was intensively influenced by entirely opposing schools. The six antagonistic influences upon Humboldt's thought, as expressed by Brown, are:

- Deductive/theoretical rationalism versus inductive empiricism.
- On the one hand a universalistic approach towards language as within the tradition of the Port Royal school, stating that the various languages of the world have at their basis a similar, universal grammar. On the other hand the national characters of countries seemed to differ and, because language would be determined by this 'Volksgeist' or collective spirit, it would imply that languages differed considerably accordingly.
- Humboldt held the belief of the individual as being able to shape language as to express his or her personal feelings. This belief should be situated in the Romantic literary tradition of the individual genius of the artist. Contrary to this view is the conception of the individual as being constrained by the language he or she uses, in such a way as that the language entirely determines the thought of the individual.

Many of these apparent contradictions in the work of Humboldt can be resolved, again according to Brown, by drawing a distinction between the earlier and later writings of Humboldt. But this distinction only settles the case partially.

In his later work we can find a doctrine of linguistic relativism characterized by the following three ideas:

- Language structures have a determining influence on the thought processes of their users.
- The structures of different languages can differ in important ways. While Humboldt in his early writings adhered to the neo-Kantian approach to linguistic universality, in which the Kantian categories were assumed to be present in all languages, he later in life took on the comparative approach, showing that strong difference among languages can be found. This later view can be seen as a continuation of the ideas previously posed by Hamann and Herder.
- The structures of languages are stable with regard to their users and can not be changed by individual speakers. This notion was derived from Humboldt's ideas concerning the origin of language. Humboldt saw the origin of language as consisting of an initial phase, in which the language takes shape, and a final and irreversible phase in which the language reaches a steady and perfectly coherent structure. All languages that we know of are, according to Humboldt, within this second phase and are thus stagnant.

As we have seen, Humboldt backed the diversity of language with a sizeable body of scientific data. Similar scientific scrutiny was, however, not devoted to validating the influence of language upon thought.

Humboldt's later view regarding linguistic relativism is thus characterized by what has come to be called the strong variant of linguistic relativism, in which language and thought are equated. This strong can however with knowledge of the present research literature no longer be maintained, and it is stronger then the above defined competence variant of linguistic relativism (which does not equate language to thought). The scope of influence is total. According to Humboldt there is no thought without language, so all thought must be influenced by language.

2.4 Humboldt's influence on Boas, Sapir and Whorf

Let us now situate the writings of Humboldt within the historical context in which the

work of Boas, Sapir and Whorf took place. Even though Humboldt seems to have had no direct influence on Boas, the latter was surely acquainted with his work in an indirect way, via the writings of Steinthal and Brinton, who were both influenced by Humboldt. It is well known that Boas had a direct effect on both Sapir and Whorf. Sapir himself did come into direct contact with the work of Humboldt, for he makes mention of him in one of his articles. The direct influence of Sapir on Whorf, who seems to have never come into contact with the writings of Humbold in an unmediated way, is evident.[10]

Brown finds the above described influence of Humboldt onto Boas and Sapir to be quite considerable, as is apparent from the following quotation:

> "[...] the direct continuity from Humbolt to Boas and Sapir can be quickly indicated." [Brown1967, p. 13]

This statement seems to be a little overdone thought, provided that the influence upon Boas is indirect and Sapir only refers sporadically to the work of Humboldt, a certain relation might exists, but it is not a very overt one. The following claim, expressed a few pages later, is even more dubious:

> "[...] there is no mystery about where at least some of the properties of Boas, Sapir and Whorf came from; the line from Herder to Whorf is unbroken [...]" [Brown1967, p. 16]

I would state that Humboldt's influence upon Whorf, given the exposition of Brown, is actually quite marginal. The influence upon Boas is already very slight. Brown did however find out that Boas read some of the work of Alexander von Humboldt, Wilhelm's younger brother, and infers from this that "it does not seem unlikely that at some time he [= Boas] had read some of the elder brother's [= Wilhelm von Humboldt] work on linguistics."[11] This however remains mere speculation and it may even show the eagerness of Brown to find at least some connection, however marginal it may be.

Humboldt did have a direct influence on Sapir, but this influence is – as was stated earlier – not very apparent, for Sapir only sporadically hints at Humboldt's work. When it comes to the principle of linguistic relativism, Sapir never seems to draw upon the writings of Humboldt anywhere. It is thus very unlikely that these minor influences of Humboldt upon Sapir might have made it to Whorf and cannot be proven since it appears from no single place in the writings of the latter that such influence was the case.

2.5 Whorf's conception of linguistic relativism

2.5.1 Introduction

Whorf was an outsider to the fields of linguistics and anthropology, but he did during his lifetime become involved with both. Originally a student of Mechanical Engineering at the Massachutes Institute of Technology, he after his study took on the job of fire inspector in an insurance company and kept his position there until his death. During his lifetime he became interested in anthropology from a linguistic viewpoint, claiming that an ancient culture like that of the Mayans, could be understood by observing the immanent linguistic structure of such a culture. Whorf thus saw the study of linguistics as a way to observe thinking. As he stated in one of

10 Brown1967, p.13-16.
11 Brown1967, p. 15.

the handwritten manuscripts not published during his lifetime but published posthumous in Carroll1956[12]:

> "[...] the problem of thought and thinking in the native community is not purely and simply a psychological problem. It is quite largely cultural. It is moreover largely a matter of one especially cohesive aggregate of cultural phenomena that we call a language." [Carroll1956, p. 66]

When later in life Whorf – due to the influence of Sapir – oriented his research towards the Hopi, he seemed to transport the ideas he had maintained in the study of extinct cultures to the study of live cultures, still claiming that such a culture could to a large extent be understood by observing the linguistic structure of a language, of which its users are generally unaware. And we can indeed occasionally find similar statements in his later work, as for example in the 1942 article *Language, mind and reality*:

> "Actually thinking is most mysterious, and by far the greatest light upon it that we have is thrown by the study of language." [Carroll1956, p. 252]

Whorf did come into contact several times with native speakers of the languages he was studying. I intend to state this here explicitly, because some authors say that Whorf was a hobbyist who reached at his knowledge of non-western languages through written report only. But Whorf surely wasn't a mere hobbyist. Even thought he never fulfilled any academic function during his life, he was often asked to do so (but repeatedly rejected these offers).[13] He was sporadically a lecturer at Yale, giving readings on anthropology.[14] He had frequent contact with academics, most notably with Sapir.

Whorf did furthermore come into direct contact with various speakers of the non-western languages that he was studying. In 1930 he made a trip to Mexico, funded by the research fellowship from the Social Science Research Council.[15] On his journey he "gained access to several excellent informants who spoke a form of Aztec which was believed to approximate, as closely as one could expect over the years, the classical dialect of Aztec once spoken in Tenochtitlan (now Mexico City) at the time of Montezuma."[16] Also the Hopi, who play an important role in Whorf's work on linguistic relativism, were originally observed by him:

> "Perhaps through the good offices of Sapir, he [= Whorf] made contact with a native speaker of Hopi, who then lived, conveniently enough, in New York City." [Carroll1956, p.17]

and

> "[...] in 1938 Whorf was able to spend a short time on the Hopi reservation in Arizona." [Carroll1956, p. 17]

Even though Whorf did at least some thorough studies into certain non-western languages, he did – as was the case with Humboldt, and had also be the case with Boas and Sapir – no research whatsoever into the thought and/or perception of people using different languages, except through the observation of that people's language.[17]

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12 According to Carroll the manuscript was written in late 1936. [Carroll1956, p. 65]
13 Carroll1956, p. 5.
14 Carroll1956, p. 16.
15 Carroll1956, p. 11-14.
16 Carroll1956, p. 14.
17 He did, very sporadically, make certain *remarks* about the thoughts of his participants, but these

By only observing the language use of various people, he does not derive at a correlation between the thus discovered linguistic structures and the cognitive structures of the observed people.

Brown and Lenneberg were the first to point at these methodological deficiencies in Whorf's writings. In the writings of Whorf, as collected in Carroll1956, one will thus find no hypothesis of any sort. Only scarcely does Whorf try to 'prove' his otherwise taken for granted view that language influences thought. For example in his famous article *The Relation of Habitual Thought and Behavior to Language*[18] he gives examples from his practice as a fire inspector in various factories where accidents happened due to – as Whorf claims – linguistic matters[19]. Even though these examples are completely unscientific, unreliable and merely anecdotical, it is one of the scarce places in Whorfs writings where he tries to observe differences in thought – in these examples observed through behavior – as correlated with differences in language categorization and language structure. So it is not true that Whorf only provides linguistic data, as is often claimed.[20] Although the non-linguistic data that he provides is very scarce, it is not entirely lagging. Further on in the same article that also provides these anecdotes, Whorf gives an explanation for his belief in the principle of linguistic relativity:

> "Which was first: the language patterns or the cultural norms? In main they have grown up together, constantly influencing each other. But in this partnership the nature of the language is the factor that limits free plasticity and rigidifies channels of development in the more autocratic way." [Carroll1956, p.156]

Whorf further explains that this is the case because language changes slowly, but influences its speakers in a substantial way, whereas culture changes at a more rapid pace. So what we find here is exactly the same line of thought as we saw in Humboldt: the individual is unable to change the collective system of language.

2.5.2 Ascribing the Sapir-Whorf hypothesis to Whorf

Many commentators have attributed to Whorf a certain hypothesis, often called the Sapir-Whorf hypothesis. This hypothesis comes in many forms, but they all involve the testing for correlations between language and thought (and, ideally, establishing the causal flow between these two components as well). Such an attribution of a hypothesis to Whorf is however misleading, because to maintain a hypothesis implies that one is involved in an active study of the independent and dependent variables (language respectively thought) and their interrelation. It would from such a point of view seem to be quite strange that Whorf rarely makes observations about thought at all, let alone systematic observations in a scientific setting. The same thing can be said about Humboldt, Boas and Sapir, for none of them was considered with the principle of linguistic relativism as a *hypothesis*. It was, rather, an assumption on the basis of which their research was performed.

Whorf does provide certain insights into the thoughts of his subjects, through the observation of behavior, as in the anecdotes concerning his work as a fire inspector.

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should not be considered scientific observations (as will be explained below).

18 Carroll1956, p. 134-159.

19 Carroll1956, p. 135-137. The most renown of the six examples provided here by Whorf is undoubtedly the anecdote of the 'empty' gasoline drums. This example is, because of its centrality to the topic of linguistic relativism, extensively treated in paragraph 4.1.

20 For example: "The problem with Whorf's data is simply that they are entirely linguistic; he neither collected nor reported any non-linguistic cognitive data […]" [Brown1976, p. 128]

But these anecdotes do not fulfil the requirements of decent empirical research, for they are based on Whorf's subjective interpretation of the situations and are all singular – and thus possibly incidental – cases. He also considered the projection of the linguistic structure of a language upon certain of the general properties of the culture in which that language is utilized[21]:

> "The formal equality of the spacelike units by which we measure and conceive time leads us to consider the 'formless item' or 'substance' of time to be homogeneous and in ratio to the number of units. Hence our prorata allocation of value to time, lending itself to the building up of a commercial structure based on time-prorata values: time wages [...], rent, [...], insurance premiums" [Carroll1956, p. 153]

Whorf even goes so far as to conclude that the linguistic structuring of time in Western languages, which characterizes time as a monotonic and regular continuum, limitlessly progressing in both past and present, causes Western speakers to hold a "false sense of security or an assumption that all will always go smoothly, and a lack in foreseeing and protecting ourselves against hazards."[22] Thus Whorf returns again to his practice as a fire inspector, claiming that people in Western cultures are, by their languages, drawn towards negligent behavior. But these claimed parallels are all merely based on Whorf's intuitions and no additional evidence is provided. It will thus never be possible to validate such claims, and we will therefore be unable to determine whether they are true or complete fantasy.

So even though it is possible at point to some passages in the work of Whorf that are considered with thought, observed through the behavior of people and not through their use of language alone, these passages can hardly be considered attempts into establishing a hypothesis concerning language and thought.

Let us define the terms 'assumption' and 'hypothesis' as used in this context. With an *assumption* is meant an assertion of a correlation or causation between two (or more) factors that is itself not tested, but on which further research is based. Such assumptions are often called 'working hypothesis' as distinct from just 'hypothesis'. For with a *hypothesis* is meant an assertion between two (or more) factors that is itself being placed under scientific scrutiny (this may be empirical or through the use of argument).

Now it seems clear that a scientist can only maintain a certain principle as an assumption, and consequently base his or her research upon it, as long as this principle – as a hypothesis – has not yet been refuted. An argument, in which an assumption takes part, while always unreliable, is rendered unmaintainable as soon as this assumption, as a hypothesis, is proved to be false.[23]

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21 The terms 'thought' and 'culture' are in the work of Whorf strongly interrelated. The term 'thought' pertains to the cognitive processes in an individual speaker. These thoughts are only observable through the behavior of the speaker and the language that he or she uses. The term 'culture' in the work of Whorf stands for the structure of thought that parallels the linguistic structuring of the language used by a community of speakers. This thought structure is, to a large extend, similar for all the members of a society, because they are all in approximately similar ways influenced by their shared language. A structuring that they generally can not resist, for it operates below the threshold of consciousness. Only a linguist, who performs research into these hidden patternings of a language's structure, is cognizant of these influencing structures.

22 Carroll1956, p. 154.

23 Of course the influence may also be the other way round, i.e. the success of an assumption in accounting for the various research problems in a specific field of endeavor, may give some insight into the hypothetical validity of such a principle.

It may be argued that the distinction between holding the principle of linguistic relativity true as an assumption, or entertaining it as a hypothesis is just a matter of stating the same thing in different ways, or that the distinction between the two is not a substantial one. But actually the distinction is quite important and can give rise, as will be shown below, to fundamental misconceptions. For people who live according to certain assumptions, being unaware of the more nuanced and deeper views that question these assumptions' validity, are generally not considered to be constantly validating or negating hypotheses. Within the sphere of science almost everything can be called into question and can thus be regarded a hypothesis at some time. Such would imply that we are continually validating and refuting a multitude of hypotheses, the sheer number of which we are unaware.

The first mention of the Sapir-Whorf hypothesis as such, was made in the introduction of Carroll to the selected writings of Whorf.[24] Carroll therein makes mention of the term, not relating it back to any precursors who might have coined it, so it seems to be his invention, moreover because in publications prior to 1956 one doesn't come across the term.[25] The term has since then been applied to Whorf by many authors. Such an attribution hardly seems justified when the sparsity of evidence for thought differences among language groups in his work is considered. But there are even more explicit clues that seem to rebut such an ascription. For Whorf explicitly denies that correlations between language and culture (or behavior or thought) may ever be found:

> "Are there traceable affinities between (1) cultural and behavioral norms and (b) large-scale linguistic patterns? (I should be the last to pretend that there is anything so definite as 'a correlation' between culture and language, and especially between ethnolinguistical rubrics such as 'agricultural, hunting,' etc., and linguistic ones like 'inflected,' 'synthetic,' or 'isolating.' " [Carroll1956, p. 138-139]

And in a footnote placed by this sentence we read:

> "We have plenty of evidence that this [= there existing a correlation between culture and language] is not the case. Consider only the Hopi and the Ute, with languages that on the overt morphological and lexical level are as similar as, say, English and German. The idea of 'correlation' between language and culture, in the generally accepted sense of correlation, is certainly a mistaken one." [Carroll1956, p. 139]

These portions of the work of Whorf have never – or at most rarely – been cited.[26] But what does Whorf mean with this remark? For the above seems to contradict the principle of linguistic relativism in its entirety. We can only guess at what Whorf exactly intended with the term 'correlation' as "in the generally accepted sense of correlation". It is my guess that what Whorf contradicts in this passage is that a one to one mapping between cultures and languages might be found, and that he instead sees the interrelation of the two components in a more fussy way. I would like to relate the above quoted passage to the following one, which is taken from an unpublished letter from 1927 (posthumously published in the selected writings of Whorf):

> "I [= Whorf] have not been able to find a term that I need to denote a kind of connection or relation, approximation, closeness, allied character, between ideas. The

24 Carroll1956, p. 1-34.

25 Both Lenneberg1953 and Feuer1953 are talking of hypotheses, but make no mention of a 'Sapir-Whorf hypothesis'.

26 I have never come across them in any of the literature on the subject.

> only psychological term I know of that expresses connection between ideas is 'association', but this has quite a definite meaning and one that will not do for the meaning I have in mind." [Carroll1956, p. 35]

So the type of connection among ideas that Whorf has in mind is not that of 'free association':

> "One of the necessary criteria of a connection is that it be intelligible to others, and therefore the individuality of the subject cannot enter to the extent that it does in free association, while a correspondingly greater part is played by the stock of conceptions common to people." [Carroll1956, p. 36]

Whorf here seems to intend something like a semantic network, whose relations among concepts are not entirely arbitrary, but not a definite one to one relation either. In the light of these passages we can see the negation of a correlation between language and culture as a refutation of there existing an absolute mapping from the one to the other. It must be noted however that this explanation is highly interpretative and nowhere stated explicitly by Whorf. It is however necessary if one wants to make sense out of the various claims that Whorf has made. The only alternative would be to conclude that Whorf contradicts himself. Sometimes speaking of a strong determination between language and thought, whereas sometimes speaking of no relation between the two components at all. But this interpretation heavily bears upon the attribution of a hypothesis to the work of Whorf. An explanation that is in line with passages within the work itself should be preferred above an explanation that excludes certain sections of it. Therefore I maintain that the principle of linguistic relativism as we can find it in the work of Whorf should not be conceived of as a hypothesis. He was not concerned with the observation of dependent and independent variables.

We have seen in the above that a hypothesis, similar to any of the variants of the Sapir-Whorf hypothesis, is nowhere stated explicitly in Whorf's work, and that such is even explicitly refuted by him. Even though it seems quite tricky to me, one could of course still maintain that Whorf employed a hypothesis that he left implicit in his work. One is then, however, committed to derive at this implicit hypothesis from certain explicit statements in the work, and moreover there must not be too many other explicit statements in the work that contradict this newly invented implicit hypothesis. Whenever a hypothesis is attributed to Whorf, no mention is made of the fact that this hypothesis is nowhere stated explicitly in Whorf's writings. We shall delve into this topic a little deeper, where we limit the Sapir-Whorf hypothesis to the most used variant, namely the one that divides the hypothesis into a weak and a strong variant.

2.5.3 The weak and strong variants of the Sapir-Whorf hypothesis

Penn in his 1972 book *Linguistic Relativity versus Innate Ideas*, sought to reconcile the various – apparently contradictory – research results that had been attained at the time. Some studies seemed to prove the principle of linguistic relativity, whereas others refuted it. According to Penn these ambiguous results could be accounted for by dividing the hypothesis of linguistic relativity (by Penn most of the time referred to as the 'Whorf hypothesis') in two variant, a weak and a strong one. The weak version is considered with language having an *influence* on thought; the strong version claims that language *determines* thought:

> "The first difficulty is in deciding just what 'the' Whorf hypothesis is. Is it 'language determines thought', an extreme hypothesis indeed? Or is it 'language influences thought', a much milder assertion, and one which can never be disproven as long as some influence of a given language on some non-linguistic behavior of its speakers can be demonstrated." [Penn1972, p. 13]

The word 'determines' that is used with regard to the strong variant must be read as 'completely determines':

> "The extreme statement […] implies that thought is not possible without language." [Penn1972, p. 18]

For if only a subset of language would determine a subset of thought, the rest of thought could remain unaffected by the language. Then thought might still be possible without language, as far as the non-determined portions of thought are considered. Even if the totality of thought is determined by language, this could not mean that thought without language is impossible. Otherwise it would be impossible to account for the learning of a language. In order to learn a specific language (e.g. English or Russian), the acquisition process has to be guided by a certain form of non-linguistic cognition. A certain form of pre-linguistic thought must therefore exists; a system of cognition that could be replaced after a language has been learned. This strong claim, that experience of reality is impossible without language, never addresses this problem of acquisition, in which at least some experience of reality would seem to be a prerequisite.

Penn in the rest of his book assigns this strong hypothesis to Humboldt, Sapir, and Whorf. I shall concentrate on the case of Whorf, because he is the more recent of the three and because we find the claim that he holds the strong hypothesis to be true throughout the discussion of linguistic relativism until today.

Let us begin by acknowledging that the attribution of the strong variant of linguistic relativism to Whorf is not completely ungrounded, for there are passages in the work of Whorf that seem to justify such claims. It must be noted that these 'strong' statements in the work of Whorf are the most (almost the only) cited ones and the more nuanced passages, some of which have been cited in the preceding section, are rarely considered. Penn gives the follow citation of Whorf, and concludes from it that Whorf was a proponent of the strong variant of the 'Whorf hypothesis':

> "Actually thinking is most mysterious, and by far the greatest light upon it that we have is thrown by the study of language. This study shows that the forms of a person's thoughts are controlled by inexorable laws of pattern of which he is unconscious. These patterns are the unperceived intricate systematizations of his language – shown readily enough by a candid comparison and contrast with other languages, especially those of a different linguistic family. His thinking itself is in a language – in English, in Sanskrit, in Chinese." [Carroll1956, p. 252 and Penn1972, p. 29]

Penn concludes:

> "It is clear, then, that Whorf asserts the extreme hypothesis of linguistic relativity which identifies thought with language." [Penn1972, p.30]

Now these claims are surely in contradiction with the many passages in Whorf's work wherein certain portions of thought are claimed to be universal and with the passage that denies the existence of correlations between language and culture. Penn carefully excludes treatment of these passages from his book, and so have done the numerous commentators who have through the years attributed the version of strong relativism to Whorf. These passages are omitted for good reasons. It would of course be

impossible to bring the claim of the non-existence of correlations between language and thought in accordance with the claim that Whorf was a representative of the strong variant, equating language to thought. Someone who identifies language with thought (as exemplified in behavior and culture) surely cannot maintain that both are uncorrelated, such would clearly be an absurdity.

The phrase “controlled by inexorable laws” in the above stated passage is what must have lead Penn into concluding that Whorf maintained the strong variant of linguistic relativism. But this phrase should not be interpreted as meaning that thought can be completely identified with language. What is meant is that language users are generally unconscious of the patterning of their language:

> “[...] the phenomena of a language are to its own speakers largely of a background character and so are outside the critical consciousness and control of the speaker [...]” [Carroll1956, p. 211]

These patternings have at the same time a strong influence on the thoughts of the speakers, for it is their language which establishes what characteristics of a situation are important (namely those characteristics that are reflected in the grammar). Because these structurings of the grammar are below the threshold of consciousness, they become ‘inexorable laws’ that can not be disobeyed.

Penn has, in addition to the above given citation, another argument for the attribution of the strong version of linguistic relativism to Whorf:

> “Indeed, it is only by considering language and thought to be identical that Whorf would have been capable of using examples of the way a given language ‘segments reality’ as evidence to support his hypothesis. In the articles about the hypothesis, he repeatedly cites linguistic evidence [...] for the hypothesis that thought is influenced by language. If thought is not language, then such examples cannot support the hypothesis.” [Penn1972, p. 30]

This argument is an important example of how the attribution of a hypothesis to the work of Whorf can lead to serious misconceptions. The reasoning runs as follows: First we entitle a hypothesis to Whorf’s work. This hypothesis involves the observation of thought differences in a direct way (i.e. not through language), so such observations must have been on Whorf’s mind. In his work we however never observe a thorough investigation of the matter. The only conclusion therefore can be that Whorf saw language and thought as completely identical. But this reasoning is based on the assumption that Whorf was considered with the observation of thought differences irrespective of language, and language difference irrespective of thought, and that moreover he sought to interrelate these two variables by establishing which of the two was the dependent and which the independent one. In the previous section we have already seen that attributing such a methodological stance to the work of Whorf is problematic. The case is further complicated because the conclusion that Penn derives at is itself nowhere to be found in the work of Whorf.

Would the above make us feel quite sceptical about Penn's reasoning, the following examples, taken directly from the work of Whorf, seem to entirely contradict his conclusion (namely that Whorf held language and thought to be equal):

> “Moreover, the tremendous importance of language cannot, in my opinion, be taken to mean necessarily that nothing is back of it of the nature of what had traditionally been called 'mind'. My own studies suggest, to me, that language, for all its kindly role, is in some sense a superficial embroidery upon deeper processes of consciousness, which are necessary before any communication, signalling or

> symbolism whatsoever can occur, and which also can, at a pinch, effect communication (though not true AGREEMENT) without language's and without symbolism's aid." [Carroll1956, p. 239]

So Whorf took at least some components of cognition to be relatively independent of language. In his article *Gestalt Technique of Stem Composition in Shawnee* that was published as an appendix to a boom on the Shawnee language[27], a not so much quoted from article, Whorf wrote the following:

> "A discovery made by modern configurative Gestalt psychology gives us a canon of reference for all observers, irrespective of their languages or scientific jargons, by which to break down and describe all visually observable situations, and many other situations also. This is the discovery that visual perception is basically the same for all normal persons past infancy and conforms to definite laws [...]", [Carroll1956, p. 163]

And a little further, in the same article:

> "This principle of classifying referents is non-linguistic and non-semantic [...]" [Carroll1956, p. 164]

This again shows that Whorf thought of some parts of cognition to be universal and relatively uninfluenced by language differences. To show that this opinion on spatial perception, as being irrespective of language differences, was not a momentary lapse of reason on Whorf's part, only being published in some minor appendix, I shall provide a citation expressing similar thoughts from the well-known article *The relation of Habitual Thought and Behavior to Language*:

> "[...] probably the apprehension of space is given in substantially the same form by experience irrespective of language. The experiments of Gestalt psychologists with visual perception appear to establish this as a fact." [Carroll, p.158][28]

As to the topic of equating language to thought, Whorf comes to speak of this equation only once – and in a very marginal way – in his unpublished article *A Linguistic Consideration of Thinking in Primitive Communities*, which was probably written in 1936[29]. We there find the following footnote that I shall here, for completeness sake, cite in its entirety:

> "Some have supposed thinking to be entirely linguistic. Watson, I believe, holds or held this view, and the great merit of Watson in this regard is that he was one of the first to point out and teach the very large and unrecognised linguistic element in silent thinking. His error lies in going the whole hog; also, perhaps, in not realizing or at least not emphasizing that the linguistic aspect of thinking is not a biologically organized process, 'speech' or 'language', but a cultural organization, i.e., *a* language. Some linguists may also hold the idea that thinking is entirely linguistic." [Carroll1956, p. 66]

So what we find here is not a clear opposition, neither a clear support of the equation of language and thought. We can however derive from the above cited passages in which Whorf claims at least some aspects of human cognition to be non-linguistic, the

27 The article was originally published as an appendix to C.F. Voegelin, *Shawnee stems and the Jacob P. Dunn Miami Dictionary*, and was later reprinted in Carroll1956, p. 160-172.

28 Whorf's reserve towards making the domain of spatial cognition liable to linguistic influence will be shown to have been too cautious, when in section 3.2.3 we consider the experiments of Levinson that do establish significant differences in spatial cognition in correlation with language differences.

29 It was for the first time published in Carroll1956, p. 65-86.

so called 'deeper processes of consciousness'[30], that he did not entertain the idea of the equation of language and thought.

So Whorf did not maintain the strong version of the Sapir-Whorf hypothesis, because he in the first place maintained no hypothesis whatsoever, and in the second place because he never equated thought to language. He did, however, isolate certain cognitive functions that he conceived of as universal, irrespective of language differences, and he explicitly renounced the existence of a correlation between language and thought (in the sense of an absolute one to one mapping) In addition he made explicit claims about the existence of a universal structure underlying all human cognition – irrespective of the language used – as in the following citation:

> "There is a universal, *Gefühl*-type way of linking experience, which shows up in laboratory experiments and appears to be independent of language – basically alike for all persons" [Carroll1956, p. 267]

It must be noted that the idea of observing differences in thought among groups of speakers of different languages in a consistent way is a very novel invention. It did not enter the mind of Humboldt, nor Sapir, nor Whorf, but was initiated by Brown and Lenneberg in the 1950s. Just as Hamann and Herder were not engaged in a thorough study of comparative linguistics (a field of research that did not exist at the time), providing no decisive empirical evidence for the existence of fundamental language differences, so the researchers from Humboldt up to Whorf all weren't engaged in the thorough empirical study of that other essential characteristic of linguistic relativism, namely that language influences thought. So while the principle of linguistic relativism as an idea can be traced back to the middle of the 18th century, its deviant form that includes the methodological stance towards the testing of the principle as a hypothesis, did only arise two centuries later.

The idea that Whorf maintained the strong version of linguistic relativism, despite its falsity, is still the prevalent idea among contemporary scholars. For example in Boroditsky2001 we find:

> "Whorf, impressed by linguistic diversity, proposed that the categories and distinctions of each language enshrine a way of perceiving, analyzing, and acting in the world. Insofar as languages differ, their speakers too should differ in how they perceive and act in objectively similar situations (Whorf, 1956). This strong Whorfian view – that thought and action are entirely determined by language – has long been abandoned in the field." [Boroditsky2001, p. 2]

The above illustrates that the attribution of the strong variant to Whorf has endured till into the 21st century and that the current field is still in need of a correcting view on the topic.

30 As cited before from Carroll1956, p. 239.

3. Empirical research

3.1 Early research tradition (1950's-1980's)

Let us first look at some of the research that took off in the 1950's and was pursued through the subsequent decades. The research from this period is generally considered to have eventually resulted in the rejection of the principle of linguistic relativism. We shall only be considered here with the research into the domain of color recognition, for it has been the most actively investigated area within the early research tradition. Moreover the development within this subset of scientific research is characteristic of the totality of investigation into linguistic relativism of that period, namely from one of apparent validation, through a period of critical commentaries upon methodological deficiencies, into a general conception of the falsity of the principle of linguistic relativism as a whole.

3.1.1 Color vocabulary research

Empirical research into the second characteristic of linguistic relativism (that language influences thought) emerged in the 1950's. One of the first articles in which a hypothesis was tested was *A study in language and cognition* by Brown and Lenneberg in 1954. Brown and Lenneberg were inspired by the work of Whorf and had noted several methodological deficiencies in it. They entertained the thought that referent codability might lead to differences in reaction times in recognition tasks. This research was thus concerned with a weak variant of linguistic relativity, and they saw such a variant as in accordance with Whorf's work. In a later article, where Brown comes to talk about this earlier research with Lenneberg, he states:

> "Careful analysis of Whorf's examples of linguistic contrast always shows that the contrast is not absolute. It is never the case that something expressed in Zuni or Hopi or Latin cannot be expressed at all in English." [Brown1976, p. 129]

Brown and Lenneberg in their research set up the hypothesis that easily named colors are more memorable than are colors that have no name in the language used. What distinguishes their research from most others is that it is done within a single language, namely English. The conclusions of the research were that name colors were indeed more often recognised than colors without names. From this Brown and Lenneberg concluded that language did indeed influence the memorability of concepts. But they did not consider a possible third variable. Research into whether the vocabulary used in a certain language *correlates* with the thought of its language users, can indeed be performed in an intra-lingual setting. But if one is interested in establishing an *influence* of language upon thought, as was the case in the Brown and Lenneberg experiment, it is necessary to make inter-linguistic observations in order to exclude the possibility that the codability differences are universal in the thoughts of all humans, and are merely reflected in the vocabulary of the English language.[31]

This article was to be the first in a long line of research. The influence of the (number of) names for color upon thought (recognition and categorisation) is to date

31 Brown and Lenneberg thus established a correlation between color names in language and the codability of the corresponding colors in thought, and concluded from these observations that language differences *caused* differences in thought. This is however a fallacious deduction, often observed in research pertaining to the principle of linguistic relativity, and is elaborated on in paragraph 4.3.

still the most investigated topic in linguistic relativism.

In 1969 Berlin and Kay showed that the colors that were fount to be better encoded by English participants in the research of Brown and Lenneberg, were equally successful encoded by speakers of other languages that lagged a lot of the color terms that are found in English. It therefore seemed to be the case that the recognition success of focal color terms was universal to the human species.

The 1972 article *Universals in color naming and memory* by Heider (later Rosch) brought the earlier two articles together. Performing the same research tasks that Brown and Lenneberg had done, Heider now performed the experiment with both English and Dani speaking subjects (the last have only two color names: 'mola' and 'mili'). Her results showed that the performance in the recognition of the various colors did not considerably change cross-linguistically and was unrelated to the strength of codability, i.e. unrelated to the number of color names in the language.

The research into color categories is the most cited form of research into the principle of linguistic relativism. It often even is the only form of empirical research that is made mention of. The color categorisation task however focuses on a subset of thought that is strongly delimited by physiological constraints within the perceptual system. Such perceptual systems will always to a certain extent exhibit very broad similarities among the speakers of various languages, because the human body is constructed in a certain way that is characteristic of the species at large. The cognitive processes that are deeper, i.e. further removed from perception – such as logical inference, the way experience is stored in long-term memory, thinking about abstract entities – could very well be more liable to language influence than the perception processes.

There are of course certain cognitive scientists who maintain that the mind is in a similar way determined by its structure. The cognitive processes of all human beings might thus adhere to universal principles. I do not object that such might be the case in some areas of thought that is. For example non-human animals do not make use of language in the complex way that human beings do. These differences must clearly be accounted for by a certain structure of the brain, facilitating such processes in humans and not in other animals. But I strongly doubt whether universal claims pertain to the brain in its entirety. Its structure may indeed put certain limits to thought, but the space of possibilities within those boundaries might still be very large and, language could be a factor that influences which of those possible ways of thought – all within the universal limits – is used by a person.

Some researchers conclude from the negative results obtained for the research into the perception-related color categorization task alone, that linguistic relativity as a whole cannot be the case. Such conclusions are however too drastic. A more reserved claim is that the effects of language differences on thought might only be observable in those areas of cognition that are involved with concepts that are not related to perception in a direct way (and are thus less constrained by physiological strucutre):

> "A second possibility is that language is most powerful in determining thought for domains that are more abstract, that is, ones that are not so reliant on sensory experience." [Boroditsky2001, p. 19]

and:

> "Spatial metaphors can provide relational structure to those aspects of time where the structure may not be obvious from world experience." [Boroditsky2001, p. 20]

It is however too early to conclude from the present research literature that linguistic

relativism does not apply to perception. Some researches seem to provide evidence for linguistic relativism in the process of phoneme recognition in children. [32] Whereas all children at birth have the capacity to make any sound distinction possible in human languages, after six months only sounds that pertain to the language spoken are distinguished.[33] These researches are however oriented towards phoneme recognition, which is a linguistic task. Future research should therefore be performed in order to determine whether these limits in phoneme recognition are also observed in non-linguistic perception tasks.

There are other reasons why research into the influence of the (number of) names for colors upon thought should not be considered decisive in determining the validity or invalidity of the principle of linguistic relativism as a whole. For this case is only concerned with the vocabulary of a language. Now whereas Whorf does give an example of the influence of vocabulary categories upon thought[34], this is an exceptional case, and the multitude of the claims made by Humboldt, Boas, Sapir, and Whorf are regarding the grammatical structure of a language. For it is this portion of a language that is generally widespread throughout the language as a whole, whereas vocabulary categories often pertain to a specific subset of the language. Furthermore, the grammatical structuring of a language is to a larger extent background knowledge to its users then is the vocabulary, and is therefore more linked with habitual thought. And finally the grammatical structures are rarely changed (according to Humboldt the grammars of the modern languages are even entirely fixed forever), whereas the vocabulary of a language changes relatively fast.

Despite the above stated inappropriateness of deciding on the matter of linguistic relativism by sole use of the results obtained from the color naming experiments, this has generally been the case. From 1970 onwards the hypothesis was by many considered to have been invalidated. But there was a second motivation for abandoning the principle of linguistic relativism, namely the emergingbelief in universalism in the research field of cognitive science.[35]

So Davies et al. are right in stating that:

> "The status of the Whorfian hypothesis within psychology has changed from one of broad acceptance before about 1970, to one of general rejection since 1970." [Davies et al. 1998, p. 1]

Their additional claim, however, is not true:

> "The shift from belief in linguistic relativity to belief in color universals was fueled more by a general conceptual shift in the Zeitgeist than by any substantial body of empirical evidence." [Davies et al. 1998, p. 1]

We have seen that the shift within the color domain was driven by substantial scientific evidence, provided by Berlin, Kay and Heider (later Rosch). It was the combination of the two above mentioned factors – the one based on empirical evidence and local to the color domain, the other a change in the 'Zeitgeist' and general to the entirety of cognition – that initiated the change.

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32 Werker1989.

33 Kuhl et al. 1992.

34 This is the example of the number of words for snow in the Eskimo language. The example is treated in paragraph 4.2.

35 This latter influence on the belief in universals will also be discussed in paragraph 3.2.1 in relation with the work of Lucy.

There is also a methodological complaint that might be raised with regard to research into color recognition. It is treated by Boroditsky[36], although other researchers have make mention of it too.[37] The critique pertains to the categorization and similarity judgement tasks in color perception research. In these tasks participants are required to categorise, for example, two out of three presented colors as 'belonging together'. The idea of such experiments is that these classifications are established using the perceptual apparatus alone, irrespective of language. But such might not be the case, for the participants that are engaged in such a classification task can choose a certain strategy for completing the task. This strategy may well be driven by the language used by those participants. One might, for example, choose the strategy of categorizing colors according to the similar name they would be classed under in the native language. Be cognizant of the fact that this is precisely *not* what one would like to learn from such a research. Participants are expected to categorize – color in this example – according to the categories that are manifest in their minds, irrespective of their languages.

These color experiments are only unreliable if they support the principle of linguistic relativism, because then we do not know how the participants derived at their categorisations. If the research shows that no correlation between language and thought was found, i.e. when such results try to disprove the principle of linguistic relativism, those result are indeed reliable, in that the here explained methodological critique does not affect them. For in such cases the cognitive strategy guided by language and the inherent cognitive dispositions are both falsified.

3.2 Recent and current research (1990's, 2000+)

Let us now focus on the recent results of research into linguistic relativism. For these investigations mark a change with their precursors of the 70's and 80's, in that they generally prove that a certain influence of language upon thought is indeed the case. In the light of this recent body of research at least some variants of linguistic relativism have been backed with sufficient empirical data. One would of course like to know what distinguishes those recent researches, providing evidence for certain forms of linguistic relativism, from the research practice of the preceding decennia, which did often provide invalidating evidence. A possible answer might be that the recent and present research is more oriented towards the influence of grammatical structure upon cognition, whereas the older researches – especially the most cited ones involving color categorisation – were almost always concerned with the influence of vocabulary upon cognition.

3.2.1 Lucy

Lucy sees the occupation of preceding research with the influence of vocabulary differences upon thought as one of the largest deficits in the domain, and he shows this preoccupation to be conflicting with the works of Boas, Sapir and Whorf, who were generally concerned with the grammatical structuring of languages.

Lucy further notes that research into the principle of linguistic relativism has been

36 Boroditsky2001, p. 3.

37 For example Davies et al. 1998:

> "It is also possible that the differences between the two language samples may be due to some participants using a labelling strategy, rather than a perceptual one as they were instructed to do." [Davies et al. 1998]

hampered by the following three impeding assumptions that have come to be generally accepted in the field of linguistic study as of the late 1950s: The first assumption is that the basic cognitive processes in normal human beings are universal. The second one is that thought shapes language, and not the other way round. This second assumption can be traced back to the period of the Enlightenment (as has been illustrated in chapter 2), but can probably be traced back much further. The third assumption is that all languages are fundamentally the same. This is again (as was illustrated in chapter 2) a continuation of a historical line that can be traced back at least to the Port Royal school, but whose roots probably go much farther back. Chomsky placed himself explicitly within this tradition in his book *Cartesian Linguistics*, therein tracing the assumption of the universalism of language, rather arbitrarily, back to Descartes.

It is sometimes claimed that the third rule, namely that all languages are fundamentally the same, can be arrived at from the first and the second assumption, thus reducing the above list of assumptions to two statements. This derivation is however not allowed in the general case, since there may well be a third factor, other than thought, that has a certain influence upon language besides – or instead of – thought. So Lucy's claim that "This assumption [= the third assumption] may follow from the first and the second or it may be independently posited." should be augmented with the additional requirement that for the third assumption to be derived at, the second assumption must be restated as *only* language shapes thought *entirely*, thus excluding any other factors (e.g. environment). The principal originators of these assumptions were Piaget and, already mentioned in the above, Chomsky.

Lucy point to the underestimation of the importance of the habitual component in the research of linguistic relativism:

> "The Brown & Lenneberg [= Brown&Lenneberg1954] study also inaugurated a tradition of assessing thought by presenting individual subjects with experimentally controlled memory tasks rather than by analyzing naturally occurring patterns of everyday belief and behavior." [Gumpertz&Levinson1996, p. 47]

This line of research according to Lucy inaugurated "a shift of the research emphasis away from Whorf's concern with habitual thought and behavior and towards a concern with potential thought and behavior."[38] So according to Lucy these 'laboratory experiments' measure competence instead of performance. We should however not follow this claim too far, since within an experimental context subjects are placed under certain constraints (e.g. time-constraints), so that their full competence set is unlikely to be fully determined. The point that Lucy wants to make here is that this research does no longer reflect Whorf's notion of 'habitual thought'.

Lucy's own research[39] focuses on the differences in the use of plurals between English and Yucatec. English speakers use plurals for both animate and inanimate nouns in a consistent way, but not for amorphous substances (e.g. not "two waters"[40]). Yucatec speakers only sometimes make use of plurals in describing animate nouns, and never for inanimate nouns and amorphous substances. So there is an overlap between these two languages, both of them do not use plurals for describing amorphous substances. But at the same time there is a substantial

38 Gumperz&Levinson1996, p. 47.

39 Lucy1992.

40 Plurals of amorphous substances can be mediated when using a container or aggregate for such substances. One can then express the plurality of such containers or aggregates (e.g. "two drops of water").

difference, in that English speakers do use plurals for inanimate nouns whereas Yucatec speakers do not. These language differences are paralleled with differences in observed behavior:

> "In remembering and classifying [pictures], English speakers were sensitive to number for animate entities and objects but not for substances. By contrast, Yucatec speakers were sensitive to number only for animate entities." [Gumperz&Lenneberg1996, p. 49-50]

This would seem to be a very relevant distinction, for English speakers when observing a certain situation involving multiple objects will encode the plurality of objects, whereas Yucatec speakers – being presented with the same situation – will not encode this. Lucy however seems to downplay these differences:

> "So the group difference is not one of absolute level of performance [what we have come to call 'competence' in our system], but rather of different qualitative responses [what we have come to call 'performance' in our system]. Neither group's performance can rightly be regarded as superior or inferior - just different." [Gumperz&Levinson1996, p. 50]

I do not agree, and I even suspect that Lucy may here be under the influence of the first assumption a few pages earlier so strongly rejected by him. As we have seen, English and Yucatec speakers do encode their perception of the world in a different way. When both are given the same observation of a number of inanimate objects, the English speaker will be able to later on answer questions regarding the number of entities that he or she observed in the scene. The Yucatec speakers will generally be less successful in answering such questions. If all the other properties that pertain to this perceived scene are equally available (and/or unavailable) to both English and Yucatec speakers, we are entitled to state that the English language users have stored a superset of the properties that are stored by the Yucatec language users. The above also holds if the distinction between storing plurality (and other properties) is not absolute, i.e. if there are some Yucatec speakers that are able to answer questions about the number of entities and there are some English speakers who are not able to answer such questions. A global, but consistent, performance difference between English and Yucatec speakers is evidence for the one language being correlated with a memory encoding strategy superior to that of another language, given that the defect is not made up for in another way. The impact of this 'superiority' may thus be not so fierce, because it may well be the case that certain additionally memorized properties are not functional in any way and do thus not add anything significant to the cognitive capacity of the people who use it. Also the lagging of one property in memorizing events by the speakers of a certain language might at the same time be compensated with entirely different, but functionally equivalent (or even superior), properties. One should therefore not jump to conclusions too fast, but is obliged to first exclude any compensating effects.

The above shows that it is very important not to neglect disparities found between the cognitive functioning of people using different languages. Lucy's statement that we are only dealing with performance distinctions (none of the language-influenced forms of cognition being superior to the other) is, if his research results are valid, entirely wrong. We are observing here a competence difference that is quite significant in that it can be proven to imply functional differences between populations.

3.2.2 Boroditsky

Boroditsky's research[41] focuses on the influence of language on temporal cognition. An intra-linguistic study is performed into the influence of the use of spatial metaphors in language upon temporal cognition. Whereas in the English language people use a horizontal axis on which to position the various temporal events (employing words like 'before' and 'after'), the speakers of Chinese (i.e. speakers of the Mandarin language) predominantly use a vertical axis on which temporal events are positioned (employing words that are the Mandarin equivalents of 'above' and 'below'). An experimental setting was devised wherein the participants were shown a picture with either a horizontal or a vertical positioning of some spatial entities. These pictures were meant as primes that should influence the reaction time needed for the answering of a subsequently posed question about a temporal relation (using non-spatial terms like *earlier* and *later*). English participants were shown to be faster in responding to the temporal question when exposed to a horizontal prime, while Mandarin participants were faster when exposed to a vertical prime. So English users better employ the spatial primes that are in accordance with their language (and the same thing is true for the Mandarin speakers and their language):

> "Both English and Mandarin speakers answered spatiotemporal *before/after* questions faster after horizontal primes than after vertical primes [...]. This confirms the earlier findings that spatial knowledge can be used in the online processing of spatiotemporal metaphors. However when it came to purely temporal *earlier/later* questions, [the results of] English and Mandarin speakers looked very different [...]. As predicted, English speakers answered purely temporal questions faster after horizontal primes than after vertical primes. [...] When answering questions phrased in purely temporal earlier/later terms, Mandarin speakers were faster after vertical primes than after horizontal primes." [Boroditsky2001, p. 10]

According to Boroditsky this research establishes that the influence of language upon thought is one of performance only:

> "This article [= Boroditsky2001] [...] describes three new experiments that demonstrate the role of language in shaping habitual thought." [Boroditsky2001, p. 2]

Speakers are able to answer the temporal questions irrespective of the visual prime presented to them, but the reaction time it takes to answer the temporal questions goes up as soon as the visual prime is in accordance with the linguistic usage.

3.2.3 Levinson

The voluminous work of Levinson concentrates on the influence of language on the use of spatial coordinate systems in cognition. He first isolates three different coordinate systems that are in use by the various cultures in the world. I will first explicate these three coordinate systems (also called 'frames of reference') because this adds significantly to the understanding of Levinson's work. The three frames of reference that he isolates are:

- **The intrinsic frame of reference.** Herein the spatial information is object-centred, without respect to the positioning of the object in the world and without the observer's position with respect to the observed objects. The observed objects' positioning with respect to each other is described using positioning relations that are internal to the objects themselves. For example

41 Boroditsky2001.

"The cat is in front of the house." means that the cat is positioned at the front side of the house, whereby the 'front of the house' remains the same side of the house (most probably the side where the main entrance is located[42]), irrespective of the observers' positioning with respect to the house or the position of the house with respect to the rest of the world.

- **The relative frame of reference.** Herein the spatial information is centred around the observer. The observed objects' positioning with respect to each other is described using positioning relations from the viewpoint of the observer. For example "The cat is in front of the house." means that the cat is positioned between the house and the observer. The side facing the viewer may be any side of the house, not necessarily restricted to the functional side that is the intrinsic front of the house.
- **The absolute frame of reference.** Herein the spatial information is provided with respect to certain fixed bearings. Such fixed bearings (also called 'cardinal directions') differ among cultures, but they can be compared with the English words 'north', 'south', 'west' and 'east'. People who use this coordination system will thus have to constantly perform a background calculation of where these cardinal directions are, combined with a system of dead reckoning to keep track of the distance travelled with respect to the cardinal directions. For example a sentence like "The cat is south of the house." is in such languages used to signify at what side of the house the cat is positioned.

The use of these different frames of reference in thought can be reliably predicted on the basis of certain properties in the language. For example, for an intrinsic frame of reference to be used in a certain culture, the language must contain terms similar to 'front', 'back', 'side', 'left', 'right' (or sufficient equivalents of these). For a relative frame of reference it is necessary to make extensive use of the terms 'left' and 'right', but they are now treated different then in an intrinsic frame of reference. A simple example may illustrate this divergence in usage. For example the sentence "The cat is to the left of the house." might mean that the cat is to the intrinsic left of the house, whereby this left side is determined by first establishing the intrinsic front of the house (naturally the side containing the main entrance), and then consequently deriving the left side from the front side. This same sentence would in a relative frame mean that the cat is positioned to the left of the house, from the viewpoint of the observer. This left side of the house, with respect to the observer, might be any intrinsic side of the house (including, of course, the intrinsic left side of the house).

Which coordinate system is used by a person is observed by letting him or her perform in a certain experimental setting involving so-called 'turning tables'. A participant is shown a certain constellation of objects on a table, is turned around 180 degrees, and is then provided with a constellation of object on another table. The key to understanding these experiments is that when turning around the left and right positions change with respect to the absolute markings of north, south, etc. So these

42 Different cultures have different ways to determine things like the front, back or sides of an object. In English for example extensive use is made of the functional properties of an object, thereby for example assigning the term 'front' in the case of a TV to the side of the object that is operational, and in the case of a car the term 'front' is assigned to the side that is positioned at the general direction of motion. But according to Levinson1994 this is not the same for all languages. He gives examples from the Tzeltal language:

"Instead, the system is driven by an axial geometry together with an analysis of shapes, which scarcely at all refers to human use or orientation." [Levinson1994, p. 367]

experiments allow for observing the coordination system used in the mind of the participants through the observation of their behavior, unmediated by their language.

In all cognitive experiments the speakers from different language groups were observed to encode their spatial knowledge of the world in decisively different ways, that were in accordance with the coordinate system used in their native language. Within this 'turning tables' paradigm the distinct forms of spatial encoding can be distinguished. Both low level cognition, involving recognition and recall, and higher level cognition, as in the use of metal maps and transitive inference, have been tested. In the recall task participants were shown a row of aligned toy animals, all facing the same direction. Participants were then, after rotation, given these toy animals and asked to realign then in a similar order. The direction in which the new line of animals is oriented depends on the coordinate system used. For after rotation the left/right direction has been inverted with respect to the absolute coordinate directions. The observed differences in behavior were indeed in line with the language differences.

In the recognition task, participants are shown a picture of two symbols that had a certain interrelation (for example a small black dot was, with respect to the observer, positioned below a large white dot). After rotation, on another table a number of pictures were presented to the participants, on which the same symbols were drawn, oriented – with respect to one another – in different ways. The participants that used the absolute encoding chose the picture on which the small black dot was displayed – with respect to the observer – above the large white dot. The participants that used the relative encoding chose the picture where the small black dot was positioned below the large white dot. So the two participants would pick out different pictures in accordance with the coordinate system that was used in their native language.

In the mental maps experiment, participants were shown a maze on the first table, and within that maze a path – with one or more directional turns – was drawn. Participants were asked to memorise this path and, after rotation, a second table was presented with another maze on it in which the memorised path could be traced in two different ways, one in accordance with absolute coordinates and one in accordance with relative coordinates. This task is more complicated then the preceding ones involving recognition and recall, for it involves multiple directional turns.

In the transitive inference task, three instead of two tables were used. On the first table, objects A and B were shown, with object B positioned to the right of object A (with respect to the observer's viewpoint); at the same time object B was positioned in the near north of object A. After rotation the participants were shown a second table, on which the objects B and C were presented, with object C to the right of object B (with respect to the observer's viewpoint); at the same time object C was positioned to the far south of object B. After another rotation of 180 degrees – returning back to the original starting position – participants were presented with a third table on with only object A was positioned. They were subsequently given object C in the hand and were asked to put it on the table with respect to object A. If a participant was using the relative encoding, he or she would infer from the observations made on the first and the second table, that object C should be oriented to the right of object A (this is to the far north of object A in the absolute coordinate system). But if a participant was using the absolute encoding, he or she will infer from the observations made on the first and the second table, that object C should be oriented to the south of A (this is to the left of object A in the relative coordinate system). So also in higher forms of cognition, involving inference, the participants derived at different results.

Throughout all of these experiments the distinction between users of languages employing different coordinate systems could be reliable made on the basis of their results in the above described cognitive tasks. So a correlation between language and thought was established. But in order to conclude to linguistic relativity other factors that might influence language and thought at the same time must be ruled out. Such was done by correcting for the influences of ecology and/or culture upon the research results obtained. Such correlations between a third variable and thought could not be found. Other possible determinants like gender, level of literacy and cultural conservatism were all taken into account, but none of them could be correlated to the cognitive differences observed in the experiments. But even the establishing of a correlation between language and thought alone, having discarded any possible third factor, does not necessarily imply a causation of language upon thought (for the causal flow might as well be oriented the other way round). This problem was not addressed by Levinson and shall be discussed in section 4.3.

Are the untranslatable coordinate systems that are found with relative and absolute speakers an example of the competence variant of linguistic relativism? Obviously language and thought are not entirely equal (such will be discussed in section 4.4), but the difference observed in Levinson's research seems to involve a rather strong influence. People using different languages observe the world in a different way accordingly. They store their perception in different and untranslatable ways and these different encodings lead to entirely opposed behavior in certain cognitive tasks. The one has a recollection of where the observer was standing when the event happened; the other has not, but has instead other information that the user of the relativistic frame of reference is lagging, namely the exact positioning of all elements in the situation with respect to the absolute framework of cardinal directions. He or she can directly, and without extensive cognitive calculation, point in the direction where the event took place.

Levinson performed experiments in which participants that employed a language with an absolute coordinate system were able to indicate the positions of various locations with relative easy, results that would not be obtained from participants employing a language with a relative coordinate system. It is hard to establish, in an objective way, which of the two languages is superior to the other, but obviously the both are better in different domains of application.

4. The theoretical side of the matter

4.1 The careless, cigarette-dropping, half-blind, male worker

It is actually quite remarkable how many commentators fail to understand the fact that Whorf was primarily interested in language's influence on, what he himself called, *habitual thought*. The well known example of the ‘empty’ gasoline drums that in fact contain explosive vapour, as laid out by Whorf in his article *The Relation of Habitual Thought and Behavior to Language*, is one of those examples. This particular anecdote has in the various commentaries been deformed a little and has furthermore been treated with in entire isolation from the context of the original article that dealt with habitual thought.

First of all I shall illustrate the ways in which the original anecdote has come to be deformed in some commentaries that touch upon it. In Whorf's original paper the anecdote is stated as follows:

> “Thus, around a storage of what are called 'gasoline drums', behavior will tend to a certain type, that is, great care will be exercised; while around a storage of what are called 'empty gasoline drums', it will tend to be different – careless, with little repression of smoking or of tossing cigarette stubs about.” [Carroll1956, p. 135]

So in the original text no specific hazardous event has been characterized, only the general setting is described that might lead to such calamities. Furthermore the person 'smoking' or 'dropping cigarette stubs about' is left unspecified. Lenneberg, in an influential article that pointed out the various weaknesses in Whorf's work, describes this anecdote as follows:

> “An explosion had been caused by an individual who had carelessly flung a burning cigarette stub into a gas drum which this person in his insurance report called *empty*.” [Lenneberg1953, p. 464]

As can be seen there is now an explicitly referenced 'person' and it is a male. A specific explosion event is coined; the explosion was caused by the throwing of a burning cigarette stub into a gas drum. This specific event was however nowhere present in the original text. The mentioning of the insurance report is also an addition of Lenneberg and can not be found in Whorf's original article. Another mention of the same anecdote is by Pinker, his version of the story reads as follows:

> “[...] one worker caused a serious explosion by tossing a cigarette into an 'empty' drum that in fact was full of gasoline vapor.” [Pinker1993, p. 60]

So now the event is further elaborated. The person, who had already been specified by Lenneberg as being of the male sex, is now by Pinker further characterised as a worker, whereas in the original text it might as well have been the female supervisor of the storage where the gasoline drums were kept that acted careless or that had been throwing cigarette stubs about.[43] So various aspects of the story have been added already, but Pinker has something more to add to the anecdote:

> “The hapless worker, his conception of reality molded by his linguistic categories, did not distinguish between the 'drained' and 'inert' senses, hence, flick ... boom! But wait.

43 In the research field of linguistic feminism – a field in which the principle of linguistic relativism has an important role – it would be maintained that it is a predictable failure to induce from the concept of ‘carelessness’ the concept of ‘masculinity’ and ‘working class’.

> Gasoline vapor is invisible. A drum with nothing but vapor in it looks just like a drum with nothing in it at all. Surely this walking catastrophe was fooled by his eyes, not by the English language." [Pinker1995, p. 60]

When we read this, it would seem as if Pinker had himself been present at the storage facility at the time the accident happened. Such is however not the case and the anecdote is discarded as a bagatelle on the grounds of the supposed lack of perceptual scrutiny of the careless, male worker who may never have existed.[44]

This same anecdote has lead to another, more fundamental, misconception. We find Lenneberg describing the anecdote of the 'careless male person causing an explosion', and thereafter commenting upon the relevance of this anecdote for the study of linguistic relativism:

> "I cannot accept this [= the anecdote] as evidence for the assumption that behavior is influenced by language. Clearly, English is capable of distinguishing between a drum filled with an explosive vapor, one that contains only air, and one which is void of any matter. This very sentence is my evidence." [Lenneberg1953]

But Lenneberg's critique misses the point completely, in that the intention of Whorf in citing such anecdotes must be seen in the context of the entire article in which these anecdotes were narrated, which deals with language influences on *habitual thought* (something that we in this article have come to call the *performance* variant of linguistic relativity). And since the differences in habitual thought are only related to differences in performance, Whorf does not claim that the English language may not be able to verbalize certain situations, but he intends to show that linguistic descriptions might cause a person handling in a specific situation to think 'along the lines laid down by his native language'. Thus it may well be the case that a certain speaker is able to make a certain distinction in his language *in principle*, but his everyday (i.e. habitual) usage may be constrained to a subset of the entire possible space of thought, thus leading to situations as described in the anecdote. The whole case made by Lenneberg becomes even more comical when we observe that Whorf himself verbalised the two conditions that an empty gasoline drum might be in:

> "The word 'empty' is used in two linguistic patterns: (1) as a virtual synonym for 'null and void, negative, inert,' (2) applied in analysis of physical situations without regard to, e.g., vapor, liquid vestiges, or stray rubbish, in the container." [Carroll1956, p. 135]

As can be seen from the above citation, Whorf is himself fully cognizant of the fact that the English language allows its speakers to formulate the difference between the two notions of the word 'empty'. So the 'evidence' that Lenneberg gives us in the above given citation is of very dubitable worth.[45]

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44 Lenneberg also claims to have certain knowledge of the man who was supposed to have caused an explosion:

> "The person who caused the fire could have replaced the word empty by filled with explosive vapor. His failing to do so (as well as his careless behavior) points to a lack of experience with explosive vapors, perhaps complete ignorance of their existence." [Lenneberg1953, p. 464]

45 The situation becomes even more absurd as we read the lines in Lenneberg's article that precede his above quoted 'proof'. Only seven lines above the given citation we read:

> "Whorf argues that the individual's carelessness was caused by the fact that the word empty has two different meanings in English: (1) null and void, negative, inert, and (2) a space which may contain nothing but a vapor, liquid vestiges, or stray rubbish." [Lenneberg1953, p. 464]

So here we find on one page the claim that Whorf articulated the different states that an empty drum might be in, and the claim that articulating these different states in English (which is exactly

Let me, as a final note on this topic, explicate that I do not find these anecdotes – the specific anecdote elaborated upon in the above, nor any of the other anecdotes narrated by Whorf in the same article[46] – relevant for the principle of linguistic relativism at all. But this is not because I claim to know whether the subjects of those anecdotes were well-trained or not, or whether their senses had been deceiving them or not, such I simply can not know. I regard these anecdotes as irrelevant to the principle of linguistic relativity because they do not adhere to the methodological rigour that empirical research requires, for they do not scale up to a sufficiently objective level. They rely on strong subjective interpretations from the side of Whorf and are singular events that can not easily be reproduced.

4.2 The great Eskimo vocabulary hoax[47]

4.2.1 Counting is a handful job

Let us now turn to what is indubitably the most often cited example of linguistic relativism. It is so central to this topic – or has at least been considered to be so by many authors – that almost all of the textbooks that describe the principle of linguistic relativism (or only its more restricted variant: the Sapir-Whorf hypothesis) do so by making (sometimes exclusive[48]) use of this example. The topic has for decennia been a point of fervent discussion. The various claims of the number of words designating snow in the Eskimo language (or the claims about claims) range, according to Pinker, from two to as many as four hundred:

> "They [= the Eskimos] do not have four hundred words for snow, as it has been claimed in print, or two hundred, or one hundred, or forty-eight, or even nine. One dictionary puts the figure at two." [Pinker1995, p. 64]

Unfortunately Pinker, as in the rest of his book, gives no explicit sources for his claims. The numbers have 'been claimed in print', which may as well include unscientific sources. Martin comes with a slightly different range of numbers, the highest of which is 200, as observed in a local television broadcast of snow forecasts. The highest number, according to Martin, that has been given 'in print' is 100.[49] According to Martin these disparate numbers have been caused by "Relying increasingly on the dubious value of surveys and summaries instead of on the original sources [...]"[50] Later on in the article she suggests improving the discussion by making "careful use of sources"[51]. We shall, however, see that she herself might have been not as carefulness as she claims to be.

The long tradition of disparities, or 'The Great Eskimo Vocabulary Hoax' as Pullum has come to call it, was initiated by Boas in 1911. He distinguishes four lexically unrelated words for snow in the Eskimo language.[52] The topic was for the first time brought into connection with the principle of linguistic relativism by Whorf. It does, however, only feature very briefly:

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the thing that Whorf has done) is evidence for disproving the statements of Whorf.

46 Carroll1956, p. 135-137.

47 The title is taken from Pullum1991, p. 159-171.

48 For example: "Estman [= Carol Estman's 1975 survey of linguistic approaches in anthropology, *Aspects of Language and Culture*] summarizes the Sapir-Whorf hypothesis [...] entirely by reference to the snow example." [Martin1986, p. 419]

49 Martin1986, p. 420.

50 Martin1986, p. 421.

51 Martin1986, p. 421.

52 Boas1911, p. 25-26.

> "We have the same word for falling snow, snow on the ground, snow packed hard like ice, slushy snow, wind-driven flying snow – whatever the situation may be. To an Eskimo, this all-inclusive word would be almost unthinkable; he would say that falling snow, slushy snow, and so on, are sensuously and operationally different, different things to contend with; he uses different words for them and for other kinds of snow." [Carroll1956, p. 216]

If we count the number of snow-related descriptions that Whorf enumerates in the above citation, we derive at five. Caution should however be taken, because it seems unlikely that he was trying to give an exact and complete overview of the snow-designating words in the Eskimo language. It might as well be the case that he here gave an arbitrary number of English descriptions for various forms of snow, not claiming that the Eskimo language holds exactly five words, nor that these words must correlate exactly with the given English descriptions, for Whorf does not provide us with the Eskimo counterparts to the five English descriptions themselves. A few pages earlier though, in one of the figures accompanying the article, the number of words for snow in the Eskimo language is explicitly stated:

> "english – one word (snow)
> eskimo – three words" [Carroll1956, p. 210]

So here Whorf clearly specifies the number of words, namely three. He here again makes no mention of the exact counterparts in the Eskimo language, although a tentative description of the three words for snow is given by three accompanying pictures, showing functionally different kinds of snow[53]. Various commentators nevertheless claim that Whorf held a different number of words for snow in the Eskimo language:

> "His [= Whorf] English glosses suggest as many as five, but not the same set given by Boas." [Martin1986, p. 418]

But there are apparently more interpretations of the quite clear statement "ESKIMO – THREE WORDS", for Pinker derives not at three, not at five, but at seven different words for snow:

> "In 1911 Boas casually mentioned that Eskimos used four unrelated word roots for snow. Whorf embellished the count to seven and implied that there were more." [Pinker1994, p. 64]

Now as far as the first sentence, on Boas, is concerned we can agree. But according to Pinker Whorf used seven words and moreover 'implied that there were more'. But the above cited passage of Whorf, together with the description drawn from the figure and also cited above, constitute the only mentions of the number of words for snow in the Eskimo language in the totality of Whorf's works. It is too bad that Pinker in his book never provides sources, so that we may not know where he came across the number 'seven' in Whorf's work.[54] It seems however probable that he is basing his claims on

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53 These are (1) snow falling down, with a person walking in the snowfall, (2) snow covering the surface, with footsteps in it, and (3) snow in the form of building blocks, used for building igloos.

54 Pinker does only say the following about the source for the number seven claim:

> "His [= Whorf's] article was widely reprinted, then cited in textbooks and popular books on language, which led to successively inflated estimates in other textbooks, articles, and newspaper columns of Amazing Facts." [Pinker1995, p. 64]

If the article that he is basing his claims on is 'widely reprinted' and 'cited in textbooks' it is probably one of the popular articles that were printed in the *Technology Review* or the equally popular article *The Relation of Habitual Thought and Behavior to Language*. These four articles all

an article of Pullum[55]. After citing the same passage from Whorf as has been cited in the above[56], Pullum writes:

> "Notice that Whorf's statement has illicitly inflated Boas' four terms to at least seven (1: 'falling', 2: 'on the ground', 3: packed hard', 4: 'slushy', 5: 'flying', 6, 7, ...: 'and other kinds of snow' " [Pullum1991, p. 163]

Pullum's book is indeed made mention of in the reference section of Pinker's book, thus it is very probable that he derived at the number seven from this source. But of course there are not seven words for snow, not even seven English words, to be found in Whorf's citation. And Pullum can only (not surprisingly) explicitize five of them.

4.2.2 The empirical relevance of the matter

The empirical validity of this claim, that the Eskimo language has more words for designating snow than has the English language, has been disputed and is nowadays generally accepted as being false. This is not to say that there has through the years appeared any form of substantial research that has established that the Eskimo language contains only one word for snow, for such is not the case. Rather texts like those of Pullum, Martin and Pinker have elucidated that no sufficient evidence supporting the case exists. This does not mean that the case has been invalidated in any way. According to Martin herself:

> "The structure of Eskimo grammar means that the number of 'words' for snow is literally incalculable [...]" [Martin1986, p. 419]

So the question of how many words for snow there reside in the Eskimo language is not established as of yet, so it is equally false to state that the example has been disproven. The problem may rather be called undecidable at the present stage.

But whatever may or may not be the case regarding the truth or falsity of this claim is not – at least not for the discussion of linguistic relativism – distinctively relevant, for a short observation of the claims made regarding this topic shows that the two concepts that we have been interested in all along – namely language and thought – do not avail to describe the Eskimo situation entirely. We have *three* concepts here – language, thought and environment.[57] Now what the example suggests is that because of the overwhelming presence of snow in their environment, Eskimo's have come to identify certain distinctions among the various forms of snow that people living in other environments, only scarcely coming into contact with snow, do not notice. The Eskimos are thus lead to have multiple words in the language and, accordingly, multiple ideas in the mind pertaining to what in other cultures may be talked and thought about as being one and the same concept. The popularity of the example is probably due to the inclusion of the environment variable, for within-language differences in vocabularies have received much less attention. But the

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feature in Carroll1956, and this book is also listed in the 'References' section of Pinker's book. One of the three popular articles from the *Technology Review*, namely the one called *Science and Linguistics* is the one that makes mention of the three words for snow in the Eskimo language, and it thus seems probable that Pinker intends this article, when he talks about the one that was 'widely reprinted' and 'cited in textbooks'.

55 Pullum1991, p. 159-171.

56 I.e. the over from Carroll1956, p. 216.

57 These can be defined for this specific case as follows: the language component consists of the different words for snow, the thought component consists of the multiple concepts of snow, i.e. the 'sensuously and operationally different' variants, and, finally, the environment component consists of the multitude of snow that is present in the Eskimo environment.

inclusion of the environment does not add anything to establishing the empirical validity of the influence of language upon thought. The interrelations between three variables may be formalised in various ways. There are two possible constellations in which these components' influence may be characterised, namely in the first constellation there being an influence of component A onto B and of component B onto C, while in the second constellation component A influences components B and C both at the same time. Writing out these two constellations with the variables A, B and C substituted by the three components that have been identified in the snow example, we derive at nine variants. Six of these are however entirely implausible because in them the environment component is being influenced by either the language or the thought component, which can obviously not be the case. Discarding these variants we have three remainder variants that deserve serious contemplation.

In the first variant the environment component influences the thought component, and the thought component subsequently influences the language component. In the second variant the environment component influences both the language and the thought component at the same time. In the third variant the environment component influences the language component, which influences the thought component. Notice that from these three variants only the third one involves the principle of linguistic relativism. So now we may decide whether this third variant is plausible or not, so what started out as a vague case study of the language habits of the Eskimos – in which the exact influencing and influenced factors were left unspecified – the problem now comes down to the hypothesis involving clear factors with clear interrelations among them. But the problem with this variant is that it is empirically inconclusive with respect to research into correlations. In all three cases the same correlations will be observed. Such correlations will not give us any insight into the actual causal flow, and if we would perform research into the causal flow (such could be done by changing the language component and observing whether the thought component varies accordingly), we would make no use of the environment variable, so we might as well have performed this research within the same or similar environment. So what I think has been the reason for the exuberant popularity of the snow example, namely the huge difference in environment, is not so relevant for research into the principle of linguistic relativism.

But there may be, besides the above, another reason why the snow example is not so relevant to the principle of linguistic relativity. Linguistic relativism has traditionally been identified with the difference between language *structures* and the influence of language *structures* upon thought. The examples provided by Humboldt and Boas all involve certain grammatical categories that are widely distributed throughout a whole language, instead of being restricted to a small subset of it. Vocabulary categories are almost always considered with only a small subset of language (e.g. color or snow). The principle of linguistic relativism has been related to these grammatical structurings because they are largely conceived of as being applied by its language users below the threshold of consciousness, while at the same time establishing the global pattern of properties that are obligatory to observe, because they must feature in the utterance in order to be grammatical.

This does of course not mean that research into color categories has, or that research into the number of world for snow will be entirely unrelated to the problem of linguistic relativism. It is however important to note that such vocabulary differences were never the focal point of attention of the originators of linguistic relativism and that thus for their ideas to be refuted it does not suffice to solely point

at invalidating evidence from the domains of color categorization and world for snow.

4.3 From correlation to causation

When a correlation between language and thought is found, there may be two causal links that are in accordance with these findings. In the first variant, language influences thought, whereas in the second variant thought influences language. Now for linguistic relativism to hold the second variant must be discarded. Observe that this issue must be seen as regarding certain isolated aspects of both language and thought. Of course, when observing the whole picture, it seems quite probable – from an intuitionist stance – that language and thought are to a high degree intertwined processes. What we are considered with here is thus the finding of a correlation between a subset of language and a subset of thought, and moreover the discarding of the influence of the latter component upon the former (within this subset).

Not many researchers who do find correlations between language and thought perform additional research in order to establish whether the correlations must be explained as an influence from language onto thought, rather than the other way round. In the history of linguistic relativism the language component has often been conceived of as more stable and relatively inflexible in contrast with the culture or thought component, which has generally been conceived of as being more easily altered. Especially in the work of Humboldt it is expressed that the individual is incapable of changing the language of the society that he or she lives in. Humboldt here does not mean the vocabulary of a language, which can and does change considerably over time (and sometimes even through the intervention of a single person), but what Humboldt has in mind is the grammatical structure of a language, i.e. the patternings that are spread throughout the whole of language. These linguistic structures do hardly change, Humboldt even thought of them as unchangeable (as observed in section 2.3, he maintained that all modern languages had reached a stage of stylistic perfection and were unalterable). Similar reasoning can be found in Whorf (and has been cited already in section 2.5):

> "Which was first: the language patterns or the cultural norms? In main they have grown up together, constantly influencing each other. But in this partnership the nature of the language is the factor that limits free plasticity and rigidifies channels of development in the more autocratic way." [Carroll1956, p.156]

Given this rationalisation, it seems probable that language (i.e. the grammatical structure of language) is rather invariant with respect to the easily changing culture of a society or the altering thoughts of an individual. If one appropriates these excerpts from the work of Humboldt and Whorf to the question of determining the causal flow with regard to language and thought, this would seem to discard the influence of thought upon language, for thoughts are changed with considerable ease, whereas the language does not necessarily follow such changes. But as long as there is no general method of establishing the change within a culture or a language respectively, and as long as there is no general scale of changeability onto which both changes can be plotted, whether one accepts this rationalisation will depend on whether one is inclined to accept that culture is changing more rapidly than language.

In modern research, which is generally more oriented towards finding objective evidence, this argument can no longer be applied. Most researchers therefore make no claims of whether the correlations that were found in their research should be explained as causations in one way or the other. For example the research from the Max Planck Institute in Nijmegen, while consisting of a huge body of experiments,

articles and books, never seems to address this problem of causation that is so central to the principle of linguistic relativity. Sometimes the notion of causation is not considered, but sometimes it is derived from the notion of correlation, without the inclusion of any additional data. Even in the most recently published articles we find that the transition from correlation to causation is automatically made:

> "[...] it seems that cognitive categories are variable and they align with cross-linguistically variable semantic categories [...]. This work therefore contributes to the emerging view [...] that language can play a central role in the restructuring of human cognition." [Bowerman et al. 2004, p. 113]

The wide scale absence of such additional research into the exact causal interrelations might incline someone to think that it is altogether impossible to derive at conclusive evidence indicating that the principle of linguistic relativity is indeed the case. Such reserves have therefore been stated by various researchers. One can however come up with experiments that try to elucidate exactly this matter. If language influences thought, then changing the language of a person must affect his thought. Such changes in the language of a person can be easily achieved by training. This is exactly what happens in the research of Boroditsky[58]. This experiment is in line with the second experiment mentioned in section 3.2.2. The English speakers are learned the Mandarin way of talking about time. They learned how terms like above/below and higher/lower could be used to represent the ordering of temporal events. Immediately after this learning process the participants were exposed to the same experiment as had already been performed with untrained speakers. The earlier observed differences between English and Mandarin speakers vanished:

> "None of the differences observed between English speakers and Mandarin speakers in Experiment 1 [= the experiment as described in section 3.2.2] were present after English speakers had been trained to talk about time in a 'Mandarin' way." [Boroditsky2001, p. 18]

4.4 Variants and future research

The question whether linguistic relativism holds should be redefined by asking whether some more specific variant of linguistic relativism holds. It is clear from the above that the weak variant (that some portion of language influences some portion of thought in some way) does indeed hold. The research of Boroditsky (as treated in chapter 3) provides sufficient evidence for such claims (I leave Levinson – as well as many other researches – out, for he only establishes a correlation between language and thought, but does not prove that there should necessarily be a causation of the former upon the latter).

It is equally clear from the above treated research that the strong variant (that language completely determines thought, or that language and thought are equivalent) does not hold. Such was proven by the research of Kay, Kempton and Heider (later Rosch), who showed for a subset of language and its corresponding subset in thought that no influence of the former upon the latter existed, let alone a strong determining influence (or equivalence). And besides these invalidating experiments we have other good grounds on which to rebut the idea of the equivalence of language and thought. For there are animals that do not have the capacity to use language, but who can not be claimed to have no cognitive capacities at all. The same holds for preverbal

58 Boroditsky2001, p. 17-18.

children.[59] It is sometimes claimed that high-level thought might be equivalent to language, while low-level thought (as in animals and preverbal children) is not. But there are also adults who, because of aphasic disorder, have lost (or have never had) the capacity to use language, but who do perform cognitive tasks. Some of these people do have jobs, do their own shopping, have hobbies. Pinker for example describes a patient, named Mr. Ford, who was unable to make normal use of language, but did perform quite well in nonlinguistic cognitive tasks that are generally considered to be central to human cognition, like making calculations or reading a map.[60] Furthermore, experiments by Shephard and Cooper provide evidence for there being certain cognitive tasks involving spatial reasoning, in which processing times were shown to be correlated to the angle of rotation that is needed to perform the task (or the distance that needed to be traveled on a map, etc.) rather than being dependent on the complexity of the problem (as one would expect in cases where the reasoning process is mediated by a symbol system).[61] So the strong view of linguistic relativism can not be true and it should therefore be discarded. The only use that it has had in the research tradition is as a predicate under which easy folly could be made of Whorf and other researchers who were claimed to have maintained this strong version (which was, at least in the case of Whorf, not equitable, as was illustrated in chapter 2).

So we come to the conclusion that the distinction between weak and strong relativism (or between a weak and a strong Sapir-Whorf hypothesis) is not useful for future research and should be abandoned. A new distinction is required in order to guide future research in a more successful way.

The new distinction proposed, as was already explained in chapter 1, is the distinction between a performance and a competence variant of linguistic relativism. The performance variant claims that language makes certain forms of thought (namely those that are in line with the language) more accessible to its users than others (that are not in line with the language). Language thus places no restrictions to what might be thought, it just influences the habitual usage, making certain thoughts more probable then others. This form of linguistic relativism is equal to the old notion of ‘weak relativism’ and has been substantiated by empirical evidence.

The competence variant makes stronger claims than the performance variant does, but not as strong as was the case with the old notion of ‘strong relativism’. The competence variant states that languages can limit thought, thus causing speakers of one language to have thoughts that speakers of another language have not, or (more empirically accessible) causing the speakers of one language to solve certain problems that speakers of another language are unable to solve.

We have good reasons to consider the competence variant to be true as well, for if one accepts that language can cause performance differences in the minds of different language users, then this means that certain concepts are paid more attention to then

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59 These argument are derived from Fodor:
> “The obvious (and, I should have thought, sufficient) refutation of the claim that natural languages are the medium of thought is that there are nonverbal organisms that think.” [Fofor1975, p. 56]

60 Pinker quotes neuropsychologist Howard Gardner, who studied Mr. Ford:
> “Intellectual functions not closely tied to language, such as knowledge of right and left, ability to draw with the left (unpracticed) hand, to calculate, read maps, set clocks, make constructions, or carry out commands, were all preserved. His Intelligence Quotient in nonverbal areas was in the high average range.” [Pinker1995, p. 48]

61 Shepard&Metzler1971.

others. Let us take Levinson's example of different coordinate systems: when provided with the same situation, speakers of a language with an absolute frame of reference will be inclined to store the cardinal directions with respect to the situation observed, whereas speakers of a language with a relative frame of reference will be more inclined to store information about the positioning of the observer with respect to the situation. When the observed event is encoded in memory, certain aspects of the situation are stored, whereas others are left out.[62] In the memories of absolute speakers the position of the observer with respect to the situation will be left out, whereas the positioning of the objects within the situation with respect to the cardinal directions, are stored very deeply:

> "GY [= Guugu Yimithirr] speakers invariably seem to know, day and night, familiar or unfamiliar location, whether sitting still or traveling in a vehicle, where the cardinal directions lie." [Levinson2003, p. 124]

In testing how accurate such memorized absolute positionings are, Levinson performed an experiment in which speaker of Guugu Yimithirr (a language with an absolute coordinate system) were taken on a trip through the woods and were at intermediate stops asked to point in the direction of certain building and locations. These locations' distances ranged from a few kilometers to several hundred kilometers away from where the participants were at the time of the experiment. The responses were given very quickly, almost immediate. The pointings of the Guugu Yimithirr speakers deviated around 13 percent on average. Such results could, according to Levinson, never have been obtained from English participants (or other relative speakers)[63]:

> "Given the varied nature of the locations where readings were taken (true bush to roadside), the different speed of travel (foot, vehicle on good gravel roads vs. bush track), the approximate nature of some of the readings due to many sources, the great distance, and in some cases the relative unfamiliarity of some of the locations pointed to, these are very impressive results. Nothing like this can be obtained from European populations […]" [Levinson2003, p. 127]

Such results can only be obtained by assuming a constantly active background process that keeps track of cardinal directions, and in accordance to that an equally constant active background process of dead reckoning, in order to keep track of how far one has traveled in a certain heading. What we thus see is that what began as a mere performance distinction, assigning different probabilities to the thoughts of the speakers of different languages, has affected the way in which situations have come to be memorized. Consequently, because different aspects of reality have received more attention then others, these different encodings have come to influence deeper levels of cognition that operate on these encodings. So speakers of absolute languages are generally more successful then relative speakers in wayfinding (which is a very complicated and high-level cognitive task). So the performance difference has, through the different encodings in memory, come to initiate different cognitive processes that determine whether a person can perform a certain task or not. Such

62 It is a generally accepted view in cognitive science that it is impossible to store each and every aspect of each observed situation, and that it is thus inevitable that choices must be made in the process of encoding.

63 Although take Levinson's claim for granted, it would be reassuring to see a similar experiment be performed with English speakers in order to be decisive about these claims.

strong differences in cognition are what we would call differences in competence.

Now some would object that it is always possible for a relative speaker to be trained in a certain way as to be able to store the positioning of situations with respect to certain cardinal directions. And it may equally be possible to train absolute speakers to store the position of the observer for each event. And these additional characteristics might be described in the speakers' native language. So it is in principle possible to calibrate both manners of thought within one language. So it could not be the language putting limits to what might be thought. But this, whether languages allow certain things to be expressed in principle, is not what we mean with the term 'competence'. For it will always be possible to, in principle, express anything in any language. This is the case because languages are functionally complete:

> "A basic maxim in linguistics is that anything can be expressed in any language." [Lenneberg1953, p. 467]

Lenneberg derived at this claim from Sapir, who stated this maxim as follows:

> "[…] we may say that a language is so construed that no matter what any speaker of it may desire to communicate, no matter how original or bizarre his idea or his fancy, the language is prepared to do his work." [Mandelbaum1949, p. 153]

Obviously the speakers of all language have the same intellectual capacities, so it will be possible to train speakers from any language to use the same categories and the same vocabulary as in any other language. What we are concerned with when we focus on competence differences among the users of different languages is whether the thinking that can be observed in these users changes in a considerable way or not, without further training.

How should this future research, that uses the new division between a performance- and a competence-related variant, be devised? I shall give a concrete example of a research set-up that is realistic, in that it builds upon present research that has already proved to be successful, and at the same time provides further insight into the strength of influence that a language might exert upon thought.

This research set-up is based upon two successful researches that have already been performed by Boroditsky, namely the investigation that has already been treated in section 3.2.2, and another research by Boroditsky[64] that does not involve the principle of linguistic relativism, but in which she observes that speakers within a single language use different spatial metaphors in order to describe temporal relations. In English there are two different spatial representations used with regard to depicting the temporal concepts of 'front' and 'back', 'before' and 'after'. The first is called the *ego-moving* metaphor, wherein the term 'front' is assigned to the future with respect to the point in time at which the utterance is performed. It is used in sentences like "The future is in front of us." and "The revolution is before us." The second spatial metaphor is called the *time-moving* metaphor, in which the time line is represented as a flow of events from the future into the past. The term 'front' is now assigned to the past, as in sentences like "You have to pass your exams before you are entitled a certificate." and "The revolution was over before breakfast." The general conception has been that the different metaphors are only present in language, and map onto the same underlying conceptual system. But the experiments of Boroditsky show that when primed with one of these spatial metaphorical usages, participants give different

64 Boroditsky2000.

answers to ambiguous temporal questions. These answers are in accordance with the primes to which they have been exposed. This study does not provide evidence for linguistic relativism, for it only shows that the use of spatial representations influences temporal cognition, but it can be linked to the later research of Boroditsky that was related to linguistic relativism (and has already been treated in section 3.2.2).[65]

We saw that the strength of influence attained at in the research of Boroditsky was restricted to performance alone: the reaction times did vary, but all participants – both English and Mandarin speakers – were able to answer the questions in the same way. Now what is interesting for future research is whether the research of Boroditsky could be used to establish competence differences also. Such could indeed be possible. For in her 2000 article, she showed that English speakers answered the temporal questions differently in accordance with the spatial prime given to them. In her 2001 article she showed that speakers of different languages make use of spatial metaphors that are in accordance with their language, and make no use of spatial metaphors that are not in accordance with their language. Putting these two researches together would result in the establishing of a causation from language, via spatial metaphors that are in accordance with that language, towards different results in temporal tasks, based on the primed spatial metaphor. If this research will indeed provide results that are in accordance with the results that were obtained in the two isolated researches of Boroditsky, then the strength of influence could be termed to be one of competence.

65 This is Boroditsky2001.

5. Conclusion

The principle of linguistic relativism has a long history in which various important methodological turning points can be identified, exhibiting continually increasing levels of empirical scrutiny. Beginning with Hamann we saw that what had before been scattered remarks regarding the origin of language and other topics, were now for the first time unified and brought into accordance with one another. In the work of Humboldt we saw the advent of the empirical study of languages differences. In the 1950's we saw the initiation of research into establishing correlations between language and thought. This process of increasing methodological rigor has however not been completed yet, for there are still significant deficiencies within the present research practice. For example, only very few researchers establish the causal influence of language upon thought (instead of merely providing a correlation between the two). Furthermore the research question should no longer be whether linguistic relativity is true or not, for some variants clearly are, whereas others obviously are not, but modern investigations should focus on whether certain variants of linguistic relativism can be validated or not. The distinction among variants that is presently used – that between a weak and a strong variant – is not interesting for modern research because we already know the outcome of such endeavours (namely the weak variant will be validated, whereas the strong variant will be invalidated). The newly proposed distinction between a performance and a competence variant will guide future research[66] in a more oriented way, and will provide further insight into the strength of influence that a language might exert upon thought.

66 A concrete set-up for such future research has been proposed in section 4.4.

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