Relativizing linguistic relativity
Investigating underlying assumptions about language in the neo-Whorfian literature

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Abstract

This work concerns the linguistic relativity hypothesis, also known as the Sapir-Whorf hypothesis, which in its most general form claims that ‘language’ influences ‘thought’. Past studies of linguistic relativity have treated various aspects of both thought and language, but a growing body of literature has recently emerged, in this thesis referred to as neo-Whorfian, that empirically investigates thought and language from a cross-linguistic perspective and claims that the grammar or lexicon of a particular language influences the speakers’ non-linguistic thought.

The present thesis examines the assumptions about language that underlie this claim and criticizes the neo-Whorfian arguments as being based on misleading notions of language. The critique focuses on the operationalization of thought, language, and culture as separate variables in the neo-Whorfian empirical investigations. The neo-Whorfian studies explore language primarily as ‘particular languages’ and investigate its role as a variable standing in a causal relation to the ‘thought’ variable. Thought is separately examined in non-linguistic tests and found to ‘correlate’ with language.

As a contrast to the neo-Whorfian view of language, a few examples of other approaches to language, referred to in the thesis as sociocultural approaches, are reviewed. This perspective on language emphasizes practice and communication rather than particular languages, which are viewed as secondary representations. It is argued that from a sociocultural perspective, language as an integrated practice cannot be separated from thought and culture. The empirical findings in the neo-Whorfian studies need not be rejected, but they should be interpreted differently. The findings of linguistic and cognitive diversity reflect different communicative practices wherein language cannot be separated from non-language.

Keywords: Linguistic relativity hypothesis, Sapir-Whorf hypothesis, Language and thought, Neo-Whorfianism

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Ingrid Björk
1 Introduction

The present thesis concerns a specific hypothesis regarding the relationship between language and thought, namely, the linguistic relativity hypothesis, also known as the Sapir-Whorf hypothesis. Although the relationship between language and thought is a broad issue which has engaged scholars from the various disciplines of the humanities and social sciences for centuries, the notion of an influence of language is relatively new. In its most general form the linguistic relativity hypothesis claims that language influences thought. However, the terms ‘language’ and ‘thought’, and the nature of the influence have been subject to debate on and off for decades. In recent work, the relation is explored as an influence of grammar or lexicon on non-linguistic thinking. The present thesis is mainly concerned with such recent or currently ongoing research in the area, often referred to as ‘neo-Whorfian’, and not with the original thoughts of Sapir or Whorf. In this introduction the idea behind the linguistic relativity hypothesis is presented, followed by a description of the aim of the thesis. Finally the disposition of the thesis is outlined.

1.1 The idea behind the linguistic relativity hypothesis

The linguistic relativity hypothesis is the proposal that a language affects the way speakers of the language think. The hypothesis is often associated with Benjamin L. Whorf, and his teacher Edward Sapir, and is therefore also referred to as the Sapir-Whorf hypothesis. The question that is investigated in studies of the linguistic relativity hypothesis is whether features of a particular language will alter the speakers’ view of the world. For example, if the speakers of a particular language talk about time in a way that differs from e.g. the English way of talking about time, will those speakers’ perception of time differ from English speakers’ perception of time? Since there are many aspects of language and of thought, the various studies that examine the issue focus on different categories of language (e.g. lexical or grammatical), and different domains of thinking (e.g. spatial thinking or shape/material distinctions). One example of linguistic-relativistic reasoning is given in the following quotation from Boroditsky et al. (2003).
To express the equivalent of ‘the elephant ate the peanuts’, different languages show different grammatical patterns.

In English, we must include tense – the fact that the event happened in the past. In Mandarin, indicating when the event occurred would be optional and couldn’t be included in the verb. In Russian, the verb would need to include tense, whether the peanut-eater was male or female (though only in the past tense), and whether said peanut-eater ate all of the peanuts or just a portion of them. In Turkish, one would specify whether the event being reported was witnessed or hearsay. (Boroditsky et al. 2003: 61)

In order to speak their language ‘properly’, speakers of the above languages thus must attend to different aspects of the world. Given the grammatical differences, the question is posed whether it is possible that these differences affect the way the speakers think.

Do these quirks of languages affect the way their speakers think about the world? Do English, Mandarin, Russian, and Turkish speakers end up thinking about the world differently simply because they speak different languages? (Boroditsky et al. 2003: 61)

This example of reasoning should be viewed against the background that in the cognitive sciences, human thinking is to a large extent assumed to be universal, either innate or determined by universal development. For instance, concepts of space, (e.g. up, down, front, back, left, right), have been widely held to be ‘natural concepts’, originating from the upright position of the human body. However, findings of semantic diversity between languages have led many scholars to challenge the dogma of a universal conceptual space. Recently, a number of publications have emerged that deal with the issue from different perspectives. Some of them claim that language influences thought.

In order to empirically examine the relation between ‘language’ and ‘thought’, which are rather vague terms, and find evidence for an influence of thought on language, one has to make a number of assumptions and definitions. As pointed out by scholars both for and against the hypothesis (e.g. Munnich and Landau 2003), in order to investigate linguistic relativity, one has to define ‘language’ and ‘thought’, and also develop criteria for what may count as an influence. One must also explain the mechanisms for this influence. How does language shape thought, and in what areas could we expect an effect?

In recent empirical studies of the Whorfian question (e.g. Levinson 2003; Lucy and Gaskins 2001 and 2003; Bowerman and Choi 2001 and 2003), linguistic descriptions of different languages are presented. On the basis of the observed linguistic patterns, predictions about non-verbal thinking are made. In order to test the predictions, non-verbal experiments have been run.
To ensure that the experiments really measure non-linguistic thinking, the tasks have been specially designed to capture the kind of thinking that goes on when the informants are not speaking or listening to speech. The results of the studies are claimed to demonstrate that in most cases, speakers of different languages respond to non-verbal stimuli differently and in a way that could be predicted on the basis of linguistic patterns.

After examining language and non-language separately, the investigators discuss the nature of the relation between the linguistic and the non-linguistic variable. It is argued that the results are sufficient to establish at least a correlation between the two variables, and possibly also a causal relation from language to thought. That is, it is argued that learning a language with specific structures will make the speakers develop corresponding cognitive patterns. The studies do not rule out the possibility of universals at some level, but they focus on the evidence for conceptual differences between speakers of different languages. As will be described in the next section, the aim of this work is to examine the assumptions and definitions that are made in the empirical examination of the neo-Whorfian relativity hypothesis.

1.2 Aim

In this thesis I will not add further evidence for or against the linguistic relativity hypothesis or evaluate the existing empirical data in order to argue for or against the hypothesis. The aim of the thesis is to give an overview of neo-Whorfian research and the on-going debate on linguistic relativity, and to investigate which notions of language that underlie the hypothesis. The thesis concentrates on recent, neo-Whorfian, empirical studies in favour of linguistic relativity. Evidence from these studies suggests that there are significant differences between languages as to grammar, lexicon and semantic structure. In the studies, the claim is also made that there are corresponding differences in cognitive style between members of various speech communities. This is taken as evidence for a causal effect of language on thought. While arguments against the hypothesis in the debate are often made from a universalist position, and thus question the neo-Whorfian empirical findings, the critique offered in this thesis focuses on certain assumptions about language, thought and culture that are necessary to formulate the linguistic relativity hypothesis. I will argue that the claim of a causal relation between language and thought presupposes the view that:

- Language is primarily ‘particular languages’, such as English, Dutch, Tzeltal, or Korean, and should therefore be described in terms of grammar and lexicon.
Language, culture and thinking are three separate variables that must be separately investigated.

The meaning of words may be discussed as fixed in language, without reference to the situations in which the words are used.

Conceptual development and language acquisition may be described in terms of biases and strategies without reference to the situations in which language is learned.

These assumptions are in turn are based on the view that languages are stable systems, delimited wholes with fixed word meanings.

By questioning the assumptions about language that emerge in the neo-Whorfian studies I hope to show that the relativity hypothesis may be rejected from a different stance than, e.g., the universalist position. I will suggest that the empirical findings can be better understood from a different perspective on language, in which linguistic practice and socio-cultural practice are not separated. That is, my aim is not to dismiss the empirical findings of cognitive, cultural and linguistic diversity in the neo-Whorfian studies, but only the way these are used as arguments for a causal relation between language and thought.

The relativity question will not be settled by means of empirical investigation only, because the empirical facts cannot ‘speak for themselves’, and must be interpreted within a view of language and language use. In this thesis I argue against the linguistic relativity hypothesis on the grounds that it is based on a misleading view of language. My aim is to put the empirical findings in a different perspective by reflecting on the ideas of language that are fundamental to the linguistic relativity hypothesis.

1.2 Disposition of the thesis

The thesis is divided into six chapters. Following the present introduction, an outline of the history of the idea of linguistic relativity is given in Chapter 2. As pointed out above, the discussion on the relation between language and thought dates back a long time, but the notion of a linguistic relativity hypothesis is relatively new. Chapter 2 is meant to give a historical background to the more recent studies that are the primary focus of the thesis. In Chapter 3, three major areas of neo-Whorfian research of the past two decades are presented. These studies constitute the ‘data’ of the present thesis, and the chapter is meant to be a straightforward account of selected pieces of neo-Whorfian research. It therefore contains many quotations and sections written more or less in the scholars’ own words.

The first section concerns nominal number marking (e.g. Lucy and Gaskins 2001 and 2003). Lucy and Gaskins compare the number marking sys-
tems of English and Yucatec Maya. In contrast to English, in which numerals directly modify their associated nouns (e.g. one *cup*, two *cups*), Yucatec uses a numeral classifier, which typically provides information about the shape or material of the referent of the noun. The need for numeral classifiers reflects the fact that the nouns in Yucatec are ‘semantically unspecified as to quantificational unit’. It is as if all nouns in Yucatec refer to unformed substances. Lucy and Gaskins examine whether this property of Yucatec makes the speakers attend more to the material of objects than e.g. their shape. From non-linguistic tests in which subjects judge the similarity between different stimuli, Lucy and Gaskins conclude that Yucatec speakers do attend to substance rather than shape of an object, whereas English speakers attend more to shape.

In Bowerman and Choi (2001 and 2003), spatial distinctions in English and Korean are compared. For example, the IN/ON distinction in English (e.g. piece IN puzzle/ring ON finger), has no corresponding distinction in Korean. In Korean, the equivalents of ‘put ring on finger’ and ‘put piece in puzzle’ are expressed by using the verb KKITA (interlock, fit tightly). The equivalent of ‘put apple in bowl’ is expressed by the verb NEHTA (put loosely in or around). Thus, in Korean there is a distinction between loose and tight fit that crosscuts the IN/ON distinction in English. According to Bowerman and Choi, this semantic difference between English and Korean may affect the way children learning the languages develop spatial concepts.

In another case of spatial language, the spatial frames of reference that people use to describe locations and directions are examined (e.g. Levinson 1996 and 2003). In English, Dutch, and many other languages, relative terms like ‘left’, ‘right’, ‘in front of’ and ‘behind’, are usually used to describe small-scale spatial relations, e.g., the relation between two objects on a table. However, this is not the case for all languages. There are languages (e.g. the Australian language Guugu Yimithirr), in which there are no terms corresponding to ‘left’ and ‘right’. Speakers of this language use terms roughly corresponding to ‘north’/‘south’/‘east’/‘west’ for any kind of spatial relation. The English sentence ‘the ball is to the left of the cup’ would in Guugu Yimithirr be something like ‘the ball is to the north/south of the cup’. Levinson and his colleagues maintain the hypothesis that this feature has an influence on the way speakers of Guugu Yimithirr remember and think about spatial relations even when they are not speaking or listening to language. In order to test this empirically, experiments were performed in which non-linguistic spatial tasks were presented to speakers of English, Dutch and Guugu Yimithirr. According to Levinson and his colleagues, the results speak in favour of an influence of language on thought.

These studies belong to the most well-known neo-Whorfian work, but there are also others. However, for the purposes of the present thesis the studies mentioned above are sufficient.
The neo-Whorfian studies reported in Chapter 3 have attracted much attention, and also some criticism. The ongoing debate on the relativity issue contains criticism of different kinds, and some examples are reviewed in Chapter 4 of the present thesis.

Li and Gleitman (2002), and Munnich and Landau (2003) oppose the results and claim that there is in fact no evidence for an influence of language on non-linguistic thought. Non-linguistic thought is claimed to be more or less universal, and Li and Gleitman suggest that landmark information, and not language, may be the factor that evokes the responses in the studies of spatial frames of reference. Everett (2005) questions the unidirectionality of linguistic relativity and claims that language, and possibly also cognition, are determined by culture. His experience from the Pirahã language and culture of Amazonia has convinced him that cultural constraints are responsible for some very unusual features in the Pirahã morphosyntax. Greiffenhagen and Sharrock (2007) question the view of language that they discern in the studies of linguistic relativity. The hypothesis, they argue, only works under several assumptions about language: First, the assumption that the only purpose of language is description, and second, that all description presupposes an ontological theory or a metaphysics.

After having reviewed several examples of neo-Whorfian studies, and several contributions to the on-going debate on the subject, I turn to the questions that I believe to be the most important for the evaluation of the hypothesis. These include the distinction between ‘language’ and ‘languages’, the division between ‘language’ and ‘non-language’ and the division between ‘language’ and ‘culture’. Although they overlap, these questions are addressed in different sections of Chapter 5. The purpose is to show that the linguistic relativity hypothesis itself is dependent on underlying assumptions about language. In chapter 5, I suggest that the empirical findings of the studies are better understood in a different view of language.

Finally, Chapter 6 presents a summary and some concluding remarks.
Historical accounts of the idea of linguistic relativity often trace it to German language theory and especially Humboldt, and mention Franz Boas and Edward Sapir as the most important names in the development of the idea in America (see Joseph 1996, Koerner 2000, and Lee 1996 for more thorough discussions of its intellectual roots).

The ‘linguistic relativity hypothesis’ is usually ascribed to Benjamin Lee Whorf, and is often referred to as the ‘Sapir-Whorf hypothesis’. However, the term ‘linguistic relativity hypothesis’ was not Whorf’s own.¹ According to Hill and Mannheim (1992) and Lee (1996 and 2000), Whorf never formulated his ideas as a hypothesis about the relation between language and perception or worldview, but as ‘the linguistic relativity principle’. As a principle rather than a hypothesis it should be interpreted as an axiom.

Whorf, who was trained as a chemical engineer, was initially self-taught in linguistics, but studied part-time under Sapir at Yale from 1931.² According to Lucy (1992a), Whorf’s interest in and formulation of the relativity principle stemmed in large part from his contact with Sapir. Whorf’s production includes general descriptive work on the Hopi language and other contemporary and ancient languages. Like Boas and Sapir, Whorf held the view that language was classificatory, isolating and organizing elements of experience.

We dissect nature along lines laid down by our native languages. The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds – and this means largely by the linguistic systems in our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way – an agreement that holds throughout our speech community and is codified in the patterns of our language. The agreement is, of course, an implicit and un-

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¹ According to Koerner (2000) the term ‘Sapir-Whorf hypothesis’ was probably first used by Harry Hoijer in 1954, but was made widely known by John B. Carroll (1956) in his posthumous edition of Whorf’s papers.

² Some critics have doubted the quality of Whorf’s linguistic work, pointing to his career as a fire-prevention engineer and his limited formal training in linguistics, but his abilities as a linguist are mostly not questioned, and his linguistic work is mentioned with great respect.
stated one, but its terms are absolutely obligatory; we cannot talk at all except by subscribing to the organization and classification of data which the agreement decrees. (Whorf 1956: 213–14)

Whorf formulated the relation between language and thought as ‘the principle of linguistic relativity’, which holds that all observers ‘are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated’ (Whorf 1956: 214). These automatic involuntary patterns of language are specific for each language and constitute its grammar, ‘a term that includes much more than the grammar we learned in the textbooks of our school days’ (Whorf 1956: 221).

From this fact proceeds what I have called the ‘linguistic relativity principle,’ which means, in informal terms, that users of markedly different grammars are pointed by their grammars toward different types of observations and different evaluations of externally similar acts of observation, and hence are not equivalent as observers but must arrive at somewhat different views of the world. (Whorf 1956: 221)

Whorf’s ideas inspired some research in the area in the 1950s and 60s, mostly within the fields of psycholinguistics and anthropological linguistics (see Lucy 1992a for an extensive overview of empirical studies of that period). According to Lucy, the anthropological linguistic studies (e.g. Lee 1944 and Mathiot 1962) were mostly linguistically oriented case studies that concentrate on the study of language without providing cognitive or cultural data. They are typically concerned with the relation of one single language to an associated culture. Many studies read cultural beliefs directly off linguistic forms and do not look for cognitive evidence. Others present ‘non-linguistic data’ in ‘linguistic’ form. Later research in the same tradition has made theoretical contributions. Hymes (1966) emphasizes the importance of patterns of use, that a claim about relativity on a structural level is dependent on commonalities in cultural language use. Bernstein (1971) argues that different social classes use different codes, elaborated or restricted, and that this affects educational results. However, according to Lucy, most research in the anthropological tradition lacks a cross-linguistic comparative perspective and does not empirically investigate a non-linguistic variable.

The psycholinguistic studies may be divided into two groups, those concerned with some aspect of grammar and those that investigate lexical codability. In the latter group many studies investigate the relation between lexical coding and memory in the colour domain (e.g. Lenneberg 1953). These studies showed a positive relation between colour terms and people’s ability to recognize a given colour in an array, which was taken as support for the hypothesis that colour terms used in a given language influence the way speakers partition the colour space. That is, it was suggested that the colour
terms found in a language influence the speakers’ perception of colour. Subsequent studies in the same area seemed to support the results (see Lucy 1992a: 170–76). According to Lucy, Lenneberg’s formulation of the problem directs attention to cognitive processes such as perception, memory and learning capacities rather than conceptual content, and turns the relativity question into one of how a language treats ‘objective’ reality rather than whether a language plays a role in constituting the reality of its speakers.

The results of this line of research were challenged when a second period of colour studies was initiated. Berlin and Kay (1969) presented evidence for the existence of semantic universals in the colour domain. They showed that all languages operate with a small number of ‘basic colour terms’ (two to eleven), and that the typical referents of these basic colour terms, the ‘focal colours’, tended to be the same across languages. Heider (1972), when comparing speakers of the Dani language (New Guinea) and English, showed that both Dani and English speakers recognized the focal colours better than non-focal ones, despite the fact that the Dani language only has two basic colour terms (dark and light), whereas English has eleven. She concludes that there was no influence of lexical differences on colour perception. For detailed accounts and further references, see Lucy (1992a: 177–87). Although this second group of colour research studies is theoretically similar to the work of e.g. Brown and Lenneberg, the conclusions are reversed. Both lexical coding and colour perception are suggested to be determined by underlying biological factors.

The Berlin and Kay studies were taken as strong evidence against linguistic relativity, and it is often held that from this point on interest in an influence of language on thought faded. Linguistics became dominated by Chomskyan arguments for a universal grammar and the view that language is a separate system from general cognition. Within cognitive psychology, there was a notion that concepts come first and that language merely names them, so that nouns name persons, places or things, and verbs name actions and events, etc.

It was not until decades later that the linguistic relativity issue would be seriously investigated again. In the early 1990s, several important studies emerged which emphasized the need to rethink and reformulate linguistic relativity (Schultz 1990; Lucy 1992a and b; Lee 1994 and 1996; Gumperz and Levinson 1996a). Schultz (1990) argued for a re-reading of Whorf’s original texts in order to avoid the common misinterpretations of his writings, and analyses Whorf from a Bakhtinian perspective. Lucy (1992a and b) emphasized the need for a comparative perspective on the relativity issue, which he argued is lacking in previous research. After making a systematic assessment of the theory and methods of early Whorfian research, he outlined a framework for further research. According to Lucy, the key notions involved in the relativity hypothesis are language and thought. Linguistic data and cognitive data must be separately investigated, and from a com-
comparative perspective. That is, to seriously investigate the linguistic relativity hypothesis one has to compare at least two languages, make cognitive predictions based on the relevant linguistic features, and empirically investigate non-linguistic thought. Lucy’s comparative approach, which presupposes contrasting data from at least two languages, and that language and cognition be separately investigated, has served as model for many empirical studies on linguistic relativity. Since then, arguments both for and against the hypothesis have been presented based on the same kind of empirical evidence. Others have addressed the issue from philosophical, anthropological, psychological, or other angles.\(^3\)

Over the years, many different versions of linguistic relativity have developed. As Lee (1996) shows, attempts to systemize the notion of linguistic relativity have led to e.g. a distinction between linguistic determinism and linguistic relativity (Fishman 1960), which is still often referred to, sometimes as strong relativity as opposed to weak relativity. Hymes (1966) suggested two kinds of relativity, one of structure and one of use. There are no exact definitions for what counts as weak or strong relativity and there is no consensus about which versions are plausible, except that the most extreme form of determinism is impossible and the weakest versions are trivial. One ‘weaker’ version of linguistic relativity suggested by Slobin (1996) is termed ‘thinking for speaking’. ‘Thinking for speaking’ refers to the mental processes that are involved in constructing linguistic utterances, without making any claims about the influence of language on other kinds of mental processes. For example, motion events are described differently in different languages. Some languages require that motion verbs be conjugated according to type of event, whether it is ‘punctual’ (or completed) or extended in time. However, in Lucy (2000) it is stated that ‘thinking for speaking’ in itself does not amount to linguistic relativity.

Whorf’s writings have been subject to much criticism and even ridicule. The debate on linguistic relativity, which has sometimes been fierce, has concerned both Whorf’s own writings and the work of his followers, and a recurrent issue is what Whorf ‘really meant’. Lee (1996), in a detailed overview of the ‘Whorf theory complex’ based on a wider range of writings than had previously been published, argues that many of his critics base their arguments on misunderstandings. Possible reasons for this may be that many scholars have not read the original writings (or perhaps just one or two papers) and rely too much on secondary literature for their judgement, or that his overall theory is not explicated in one place in his writings. Another reason may be that he had not reached ‘the point where he could synthesize the various strands of his thinking and state them as an integrated theory’ (Lee

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\(^3\) The following recent anthologies all address the linguistic relativity issue: Gumperz and Levinson (1996a), Pütz and Verspoor (2000), Niemeier and Dirven (2000), Bowerman and Levinson (2001), and Gentner and Goldin-Meadow (2003a).
1996: 15). Also his admirers have failed to grasp the nature of Whorf’s work, and especially what Whorf himself termed the ‘linguistic relativity principle’. As Lee (1996 and 2000) explains, this was one element in a broader theory complex, and it was never formulated as a hypothesis about language and thought conceived as separate variables. Whorf wrote primarily about relationships between language and thought, not influences. He spoke of ‘linguistic thinking’ and ‘thought insofar as it is linguistic’ and was thus primarily interested ‘in that range of cognitive activity which is significantly linguistic in character’ (Lee 2000: 46). The work inspired by Whorf, however, is often based on the operational separation of language and thought.

A methodological, conceptual, and logical decision to categorize some elements of behavior as having to do with language and others as having to do with thought is taken for granted and the consequent tendency to regard these as two separate domains of human functioning allows the formulation of a hypothesis that language may influence thought. (Lee 1996: 27)

According to Lee (1994), there is nothing in Whorf’s writing to suggest that Whorf thought he was working with a hypothesis that needed to be tested. That notion was introduced after Whorf’s death.

A large part of the recent studies in the area investigate the hypothesis that language and thought are separate variables in a causal relationship, and those studies are the focus of the present thesis. Whether these studies are based on misunderstandings of Whorf’s original writings is of no concern here. The thesis will treat the version of the linguistic relativity hypothesis that is investigated regardless of its relation to Whorf’s original writings.

In the following chapter, a few recent neo-Whorfian case studies are reviewed.
3 Case studies of linguistic relativity

The studies presented in this chapter form a part of the neo-Whorfian literature that has emerged in recent years. The chapter is divided into sections addressing work in three different domains. Section 3.1 concerns grammatical number marking patterns in English and Yucatec Maya and the possible cognitive consequences of these patterns. Section 3.2 concerns spatial events of the type ‘put in container’ and ‘put on surface’, how this semantic space is partitioned differently in Korean and English, and whether this might have cognitive effects on speakers of English and Korean. Section 3.3 concerns spatial frames of reference, how different frames of reference are used in different languages, and how speakers of these languages think about space. Section 3.4 summarizes the arguments for linguistic relativity that are made in the studies.

3.1 Number marking

In Lucy (1992b and 1997), and Lucy and Gaskins (2001 and 2003), the importance of adopting a comparative approach to the linguistic relativity issue is emphasized. According to Lucy and Gaskins (2001: 257), the ‘defining characteristic of the human species is its culture-bearing capacity whereby very similar biological organisms develop and sustain extraordinarily diverse behavioral repertoires’. Therefore, research on human behaviour should concern itself with this diversity and the process of its development in childhood. However, contemporary psychological research often assumes a ‘homogeneity of repertoire and of underlying psychological function – coupled with a concomitant assimilation of the psychological to the biological – and neglects the process of culture acquisition’.

In the study of the relationship between language and thought, Lucy and Gaskins argue, the need for a comparative perspective is greater than elsewhere. Nobody speaks ‘a generic Language understood by all, but rather one or more particular languages shared within a community’ (Lucy and Gaskins 2001: 258). Theories of the relationship between language and cognition must account for this diversity.
We need to know not only how a single biological organism can sustain such a diversity of languages, but also whether and how that diversity has an impact on intellectual functioning and when and how that impact takes shape. (Lucy and Gaskins 2001: 258)

These questions require a comparative perspective. According to Lucy and Gaskins, before the early 1990s there was little empirical research and what did exist had often been poorly done. In place of empirical research, ‘the literature has been filled with a wide variety of speculative answers that inevitably confirm the initial theoretical predilections of the analyst’ (Lucy and Gaskins 2001: 258). To answer the question whether structural diversity among languages has an impact on cognition one has to develop an empirical approach. The empirical research on the issue should meet four requirements (Lucy 1992b: 1–2; Lucy and Gaskins 2001: 258):

- First, the research must be comparative. It must present contrastive data on at least two language communities.
- Second, the comparison should take an external non-linguistic reality as the metric or standard for calibrating the content of both linguistic and cognitive categories.
- Third, the language analysis should concern one or more categories of reference having general significance in the languages.
- Fourth, predictions of the implications of language differences for thought should be articulated and evaluated in light of the actual nonverbal performance of individual speakers.

In Lucy (1992b) an initial case study that met the four requirements was presented. In several following studies, e.g. Lucy and Gaskins (2001 and 2003) the work has been continued. The studies compare grammatical number marking patterns in American English and Yucatec Maya, a language spoken on the Yucatan Peninsula and parts of Belize and Guatemala. They also test for associated cognitive differences. According to Lucy and Gaskins (2001: 260), English and Yucatec Maya differ in their patterns for nominal number-marking.

First, many nouns in English have distinct plural forms. Typically, nouns referring to animate entities and ordinary objects have distinct plural forms (e.g. candle, candles), but not nouns referring to amorphous substances (e.g. sugar or mud). In Yucatec, plural forms are not obligatory and are used optionally for a comparatively small number of nouns.

Second, the two languages differ in the way they enumerate nouns. In English, counting nouns that refer to amorphous substances requires specifying a unit for counting by adding a ‘classifier’ (e.g. one cube of sugar, two cubes of sugar). However, nouns referring to discrete objects include a no-
tion of quantificational unit and can be counted by using numerals directly without a classifier (e.g. one candle, two candles). In Yucatec, numerals must always be supplemented by a special form, a numeral classifier, which usually provides crucial information about the shape or material properties of the referent of the noun (e.g. ‘one long thin candle’). According to Lucy and Gaskins (2001: 260–61), the need for numeral classifiers reflects the fact that ‘all nouns in Yucatec are semantically unspecified as to quantificational unit almost as if they referred to unformed substances’. That is, ‘one candle’ in English is roughly ‘one long thin wax’ in Yucatec. The question is now whether the different patterns in the two languages lead the speakers to attend to different properties of given objects. Will the Yucatec pattern of treating objects as substances make the Yucatec speakers attend to an object’s material rather than its shape?

The contrast between English and Yucatec is maximal for nouns referring to discrete objects, and this type of noun is focused upon in Lucy and Gaskins (2001). For English nouns of this type, there is a presupposed quantificational unit, which usually is the shape of an object. Thus, use of English nouns referring to discrete objects ‘routinely draws attention to the shape of a referent insofar as this is the basis for incorporating it under some lexical label and assigning it a number value’ (Lucy and Gaskins 2001: 262), whereas Yucatec nouns of this type, since they lack a presupposed quantificational unit, do not draw attention to shape, but ‘fairly routinely draw attention to the material composition of a referent insofar as this is the basis for incorporating it under some lexical label’ (Lucy and Gaskins 2001: 262).

On the basis of the observed differences between English and Yucatec, Lucy and Gaskins make a prediction about how speakers of the two languages will classify objects they see. If the linguistic patterns translate into general cognitive sensitivity to these properties of referents, they argue, a prediction is that:

Yucatec speakers should attend relatively more to the material composition of objects (and less to their shape), whereas English speakers should attend relatively less to the material composition of such objects (and more to their shape). (Lucy and Gaskins 2001: 262)

In Lucy (1992b) this prediction was tested with adult speakers of both languages. A full description of the study is given in Lucy and Gaskins (2001). In the experiments the two groups of informants were shown triads of naturally occurring familiar objects. In each triad there was one pivot object and two alternate objects, one of the same shape as the pivot and one of the same material as the pivot. In each triad the informants were asked to decide which of the two alternates (material and shape) that was most like the pivot object. For example, when shown a small cardboard box, the informants were asked whether this was more like a small plastic box of the same size.
and shape or more like a small piece of cardboard. The prediction was that English speakers would match the pivot object to the box and Yucatec speakers would match it to the cardboard. Across a set of eight triads shown to a group of English speakers and a group of Yucatec speakers the prediction was borne out. In the Yucatec group eight out of ten speakers favoured the material alternates and in the English group twelve out of thirteen favoured the shape alternates.

The two groups thus classified the objects differently and in line with the expectations based on the grammatical structures of the two languages. English speakers tended to classify according to the shape of the objects whereas Yucatec speakers tended to classify according to material. Despite this, Lucy and Gaskins found it desirable to increase control over factors that may have influenced the results. An apparent shape (box) match might arise from attending to similarity of function as containers or to their size compared to the size of the material alternate. Similarly, an apparent material (cardboard) match might arise from attending to similarity of colour or some other property.

To explore colour, size and function as bases for classification, informants were presented with a new set of twenty-one triads in which the objects were carefully selected (Lucy and Gaskins 2001: 264–69). A few examples of the types of triads that were used are illustrated in figure 1.

The choices that the speakers made across this new set of twenty-one triads showed that ‘the rate of material choices was unaffected by color redundancy and that the rate of shape choices was unaffected by an exact size match’ (Lucy and Gaskins 2001: 265), which means that colour and size cannot explain relative preference for shape or material in the results. In order to control the function dimension or the typical use of an object, the twenty-one triads were divided into seven sets of three. The different types of triads treat the function dimension in different ways. For example, set 1 (Unifunctional Wholes) consists of three whole objects that all have a single function, and thereby function as a possible choice is neutralized. Similarly, set 2 (Trifunctional Wholes) consists of three whole objects that all have a different function, thereby neutralizing function as a possible choice.

For further details on the other triads, see Lucy and Gaskins (2001: 265–69). The responses to the new triads show that the results of the original study (Lucy 1992b) are still valid. ‘The relative shape and material preferences reported in the original study are not only replicated but also prove to be robust for stimuli of this type when the dimensions of function, color, and size are controlled’ (Lucy and Gaskins 2001: 268–69).
In order to increase the complexity of the triad tasks, a new task, called the
nine-sort task was developed. In this, the informants were asked to sort sets
of nine objects into two piles. Four of the nine objects (the material alter-
nates) were made in different shapes but of the same material. Four of them
were made in the same shape but of different materials (the shape alternates).
The ninth object, the pivot, was made of the same material as the material
alternates and in the same shape as the shape alternates. Twelve informants
from each language were asked to sort the nine objects into two piles. First,
one material and one shape alternate were placed on a tray in front of the
person performing the task. Then the rest of the objects were handed to him
or her, one by one, and the person was asked to make two piles ‘so that eve-
rything in each pile was the same’ (Lucy and Gaskins 2001: 269). The last
item was always the pivot and if the informant had built one pile of material
alternates and one pile of shape alternates, he or she would now have to
place the pivot deciding between shape and material. One of the nine-sort
sets, in which the material alternates are made of cardboard and the shape
alternates are tubes, is shown in figure 2.

In the nine-sort task the informants are forced to form a more complex
judgement over a series of objects. As Lucy and Gaskins explain, since a
variety of objects must be grouped together before the pivot comes, the risk
that e.g. the verbal name for any of the objects is used as a guide for group-

<table>
<thead>
<tr>
<th>MATERIAL ALTERNATE</th>
<th>PIVOT</th>
<th>SHAPE ALTERNATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unifunctional wholes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic comb without handle</td>
<td>Plastic comb with handle</td>
<td>Wooden comb with handle</td>
</tr>
<tr>
<td>2. Trifunctional wholes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardboard matchbox</td>
<td>Cardboard spool</td>
<td>Plastic straw</td>
</tr>
<tr>
<td>3. Afunctional shape pieces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper book</td>
<td>Square sheet of paper</td>
<td>Square piece of burlap</td>
</tr>
</tbody>
</table>

Figure 1. Examples of triads of stimuli (adapted from Lucy and Gaskins 2001).
ing is diminished. The procedure also provided information about how informants were approaching the classification task. The results of the nine-sort task showed that the same group differences emerge once again with an even stronger material preference among the Yucatec. This suggests ‘that the effects found in the earlier triad studies will be replicated (and may even be stronger) on more complicated tasks and that immediate lexical labeling with respect to a single probe is unlikely to account for the previous triad results’ (Lucy and Gaskins 2001: 271).

Figure 2. A nine-sort set (adapted from Lucy and Gaskins 2001).

According to Lucy and Gaskins, the qualitative information provided by this task supports the interpretation given to the quantitative data.
The Yucatec speakers were constantly evaluating the material composition of the test items before sorting them: feeling how heavy they were, poking their nails into them to test for malleability, scraping the surface to see what the material under the paint was, smelling and tasting the objects, and generally questioning or commenting on their material properties – and all this with familiar objects. The English-speaking Americans showed none of this sort of reaction – they could get all the information they needed by sight alone. (Lucy and Gaskins 2001: 271–2)

On the basis of the results from the classification tasks, they draw three conclusions about the relationship between the language spoken and classification preference (2001: 272):

- Classification preferences differ between the two groups. English speakers show a relative preference for shape-based classifications, while Yucatec speakers show a relative preference for material-based classifications.
- The findings are robust and have proven replicable across many years, samples, stimulus configurations, and task types.
- These relative classification preferences were predicted on the basis of the semantic patterns implicit in the grammatical categories of English and Yucatec.

All these factors ‘converge to suggest that the cognitive differences stem at least in part from the grammatical patterns’ (Lucy and Gaskins 2001: 273).

To examine the formation of these language-related preferences in childhood, Lucy and Gaskins ran the experiment on a group of children. Since pilot work had shown that there is a point in development between the ages of seven and nine when language-related preferences begin to arise, the triad tasks were presented to twelve English-speaking and twelve Yucatec-speaking children of each age. On the whole, both English-speaking and Yucatec-speaking seven-year-olds showed a bias towards shape. By age nine, the English-speaking children continued to favour shape (17.8 % material alternates), but the Yucatec-speaking children were choosing material alternates 41.7 % of the time.

A modified version of the nine-sort task (figure 2) presented to the children yielded similar results. The seven-year-old children in both groups favoured shape (although Yucatec-speaking children showed a tendency towards the adult Yucatec pattern). By age nine the English-speaking children still favoured shape, whereas the Yucatec-speaking children had shifted towards the adult pattern (48.6% material alternates). These developmental data, Lucy and Gaskins argue, suggest that there is a ‘major shift towards the
culturally specific adult cognitive pattern by age 9’ (Lucy and Gaskins 2001: 276).

In Lucy and Gaskins (2003) a second prediction about material referents is made and tested. In this test malleable objects are used, that is, objects composed of materials such as toothpaste or salt, that can be temporarily formed into distinctive shapes. Examples of such malleable objects are shown in figure 3.

![Figure 3. Examples of triad stimuli for malleable objects (adapted from Lucy and Gaskins 2003).](image)

It is argued that since both Yucatec and English nouns referring to such material referents lack a presupposed quantificational unit, ‘their semantics should ignore the temporary shape and, in fact, should routinely draw attention to the material composition of a referent as the basis for incorporating it under a lexical label’. If the linguistic patterns ‘translate into a general cognitive sensitivity to these properties of referents of the material type, then both Yucatec and English speakers should attend relatively more to the material composition of such malleable objects (and less to their shape)’ (Lucy and Gaskins 2003: 474).

The prediction was tested with adult speakers of both languages, using a triads classification task (see figure 3). The informants were shown six triads. Each pivot and its alternates were composed of different materials such as foams, creams, gels, powders etc., and were formed temporarily into distinctive shapes. For example, when toothpaste was formed into a distinct

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4 For a fuller discussion on the developmental data, see Lucy and Gaskins (2001: 273–8).
shape and used as the pivot, the alternates were hair gel formed into similar shape and toothpaste formed into a different shape. Both the materials and the shapes were selected to be familiar to the informants, but the individual combinations of shape and material were relatively novel to them.

Size and colour were controlled, and function in the sense that the objects had no clear function. The results show ‘both groups making a substantial number of material choices as expected, with Yucatec speakers favoring material choices 53% of the time and English speakers favoring them 34% of the time’ (Lucy and Gaskins 2003: 477). Essentially the results are in line with the predictions, according to Lucy and Gaskins.

Where the two languages agree in their treatment of malleable objects, there is no difference in their degree of preference for material classification. Where the two languages disagree in their treatment of stable objects, there are divergent preferences for material or shape classification as a function of the language difference. (Lucy and Gaskins 2003: 478)

When children aged 7 and 9 were presented with the task, the English-speaking 7-year-olds children chose material 42% of the time, and Yucatec 7-year-olds chose material 46% of the time. The results are approximately the same at age 9.

The data of the studies reported above are argued to support the claim that cognitive differences between speakers of English and speakers of Yucatec depend on number-marking patterns in the two languages. The findings also illustrate the importance of a comparative approach, Lucy and Gaskins argue. The analysis is done in several steps. First, the differences in morphosyntactic structures between two languages were examined. Then the possible cognitive consequences of these differences were explored, ‘in particular, how speakers of the two languages might be interpreting reality differently beyond the act of speaking’ (Lucy and Gaskins 2001: 279). The work with adults indicates a correlation between language-specific grammatical patterns and classification preferences. Whether or not one believes that the patterns in language give rise to the cognitive differences, ‘the comparative cognitive data alone compel a rethinking of the notion of a unified developmental outcome for cognition’ (Lucy and Gaskins 2001: 279). The contrast between the adult groups is also essential to establishing when language-linked cognitive patterns arise: ‘by exploiting known differences among adults we have a powerful way to diagnose both the timing and the qualitative nature of important developmental shifts’ (Lucy and Gaskins 2001: 280). According to Lucy and Gaskins adequate understanding of human

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5 While many studies discuss the possibility that certain distinctions e.g. the object/substance distinction are present in all children prior to learning language (e.g. Gentner and Boroditsky 2001; Soja, Carey and Spelke 1991), Lucy and Gaskins emphasize that they do not assume or preclude any pre- or non-linguistic universals.
beings cannot be reached by ignoring behavioural diversity. Such understanding will only come through careful study of that diversity ‘for what it can tell us about how people’s experience of the world is mediated (developed and sustained) through languages and cultures and, in turn, how those languages and cultures are mediated (developed and sustained) by psychological processes’ (Lucy and Gaskins 2001: 281).

To summarize the number-marking studies, linguistic diversity in terms of grammatical patterns in English and Yucatec Maya has been established. Based on these grammatical differences the prediction is made that speakers of the two languages attend to different properties of discrete objects, which also seems to be confirmed by the test results. According to Lucy and Gaskins, the results cast doubt on the notion of a unified developmental outcome for cognition, and indicate the possibility that language patterns may give rise to classification preferences.

In the next section the spatial vocabularies of English and Korean are compared and the possibility of an influence on perception of space is discussed.

3.2 Spatial words in Korean

In Bowerman and Choi (2003) children’s acquisition of spatial concepts is examined from a neo-Whorfian point of view. The study focuses on categorization of certain spatial events in English and Korean such as the placement of an object with respect to another. According to Bowerman and Choi, studying the acquisition of these concepts may help answer the question whether children’s concepts emerge through non-linguistic cognitive development or under linguistic guidance. Establishing where children’s early meanings come from – non-linguistic cognition or exposure to language – is important because it provides clues to how flexible children’s cognitive structuring of their physical and social world is.

If the concepts children bring to the language acquisition task are so salient and prepotent that language is simply molded around them, linguistic influences on nonlinguistic cognition seem less likely. […] On the other hand, if children readily take on the structuring of meaning displayed in the input language, this suggests a receptivity to patterns of conceptual organization introduced from outside that makes Whorfian effects more plausible. (Bowerman and Choi 2003: 387)

Until recently, Bowerman and Choi argue, the dominant position among developmentalists (e.g. Slobin 1973) has been that non-linguistic cognition is the driving force behind children’s early word meanings. Under this view, children establish a repertoire of basic notions of object, actions and rela-
tions during the pre-linguistic period. As they begin to communicate they search for the linguistic forms that will allow them to express their ideas. According to Bowerman and Choi, within this universalist/cognitivist perspective there is little room for Whorf, but new findings about semantic diversity across languages challenge the arguments for semantic universals, and thereby one of the cornerstones for the cognitivist/universalist approach.

They present evidence suggesting that both non-linguistic cognition and language contribute to early spatial semantic development. For example, they refer to studies showing that children’s first spatial words are usually applied to the same kind of events: putting things into containers and taking them out, piling things up and knocking them down, opening and closing objects, etc. Further, spatial words seem to emerge in a relatively consistent order even across children learning different languages: First, words for notions of containment, (in), contiguity and support (on), and occlusion (under), later words for notions of proximity (next to, beside, between) and finally words for projective relationships (in front of, behind).6

However, there is also cross-linguistic variation in early semantic categorization. Bowerman and Choi (2001 and 2003) compare children learning English and children learning Korean, and suggest a role for linguistic input as well.

English and Korean differ in how they classify space. In English, there is a fundamental distinction between putting an object into an enclosure or container of some kind (put IN) and putting it on a flat or convex surface (put ON). The same semantic space is partitioned differently in Korean. This is illustrated in figure 4. The verb *kkita*, for example, has to do with ‘bringing three-dimensional objects with complementary shapes into an interlocking, tight-fit relationship’ (Bowerman and Choi 2003: 392) and has no equivalent in English.

The crosscutting of the domain of *put in* by *kkita* means that what English treats as a unified category of ‘containment’ events is, for speakers of Korean, subdivided […]: tight-fit containment events like putting a book into an exactly matching box-cover, described with *kkita*, are treated as a different class of actions from loose-fit containment events like putting an apple into a bowl or a book into a bag, described with *nehta* […]. The category of *nehta* encompasses not only loose containment events but also loose encirclement events, such as putting a loose ring on a pole […]. Just as Korean breaks down the category of English *put in*, it also subdivides the domain of *put on* […]. (Bowerman and Choi 2003: 392)

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6 For a fuller account and references, see Bowerman and Choi (2001 and 2003).
Figure 4a. Categorization of some object placements in English (adapted from Bowerman and Choi 2001).

Figure 4b. Categorization of some object placements in Korean (adapted from Bowerman and Choi 2001).
These differences are relevant to the question of linguistic relativity. If children initially associate spatial words with a universal set of basic concepts of space, these differences between English and Korean would not matter, Bowerman and Choi argue. Children learning the two languages should interpret and categorize spatial events in a similar way. But in a study of spontaneous speech (Choi and Bowerman 1991), it was found that language-related differences occur by the age 17–20 months. As soon as the children used the words productively for both familiar and novel situations, learners of English ‘distinguished systematically between actions involving containment (in) and those involving surface contact/support (on), regardless of fit, while learners of Korean ignored this distinction in favor of a discrimination between tight fit and various loose-fit and loose contact events’ (Bowerman and Choi 2003: 395).

To allow for more exact comparison, Bowerman and Choi designed an elicited production study to examine how speakers of English, Korean and Dutch encode actions of joining and separating objects (e.g. Bowerman 1996). Elicited descriptions of a wide range of actions were obtained from 10 adult speakers of each language and 10 children in each of three age groups, from 2 to 3½ years. Actions such as e.g. putting objects into tight and loose containers and taking them out, putting objects down, opening and closing, buttoning and unbuttoning were included in the study. To compare how speakers from the different age and language groups classified the actions, Bowerman and Choi examined which actions for which they used the same expressions and which actions they distinguished.

They argue that if there is a universal set of basic spatial notions onto which language learners initially map spatial words, children in the youngest age group at least, could be expected to classify events like children of the same age learning other languages, and not like adult speakers of their own language. If they classify more like adults speaking their language, this means that their word use is ‘guided by categories that are already language specific, even though perhaps not yet entirely adultlike’ (Bowerman and Choi 2003: 397).

The outcome of the analyses was that, even in the youngest age group, children grouped and distinguished the actions significantly more like adult speakers of their own language than like children of the same age learning the other two languages. By the age of 2 to 2.5 years, children learning different languages ‘classify space in strikingly different ways for purposes of talking about it’ (Bowerman and Choi 2003: 397).

According to Bowerman and Choi, early language-specific variation of this kind does not necessarily mean that children actively construct concepts. An alternative explanation is that children’s early non-linguistic repertoire of spatial concepts is so extensive that the children select from concepts already available to them. However, studies of e.g. error patterns point in the direction that there is a role for language in the formation of spatial concepts (for
a fuller description of all tests, see Bowerman and Choi 2003). On the Whorfian question, Bowerman and Choi conclude that:

If the requirement to learn the meanings of the words in their language causes children to form concepts of space that they would not otherwise have had, then in this minimal sense language can be said to affect cognition. (Bowerman and Choi 2003: 414)

But to state that there is a Whorfian effect of language on thinking, there must be ‘evidence that even when people are not talking or listening to speech, the structure of their language influences their cognition—for example, their perceptual sensitivities, their nonlinguistic similarity judgements, their recall accuracy, or their problem-solving strategies’ (Bowerman and Choi 2003: 414).

For evidence of a ‘real Whorfian effect’, they refer to a study by McDonough, Choi and Mandler (2003), in which both infants and adult speakers of Korean and English are presented with a non-verbal ‘preferential looking task’. Infants of different ages (9, 11 and 14 months) from both English and Korean-speaking environments were shown six pairs of video-taped scenes of putting one object into another. Half of the infants were shown scenes of tight-fit containment and half were shown loose-fit containment. After this ‘familiarization’, another two pairs, the same for all children, were shown. In these ‘test’ pairs, one scene showed putting a novel object into a tight-fitting container, which was a novel relation for half of the infants. The other scene showed putting the same object into a loose-fitting container, which was a novel relation for the other half. Infants from both language environments and all three age groups looked significantly longer at the scenes showing the familiar relation than at the scenes showing the novel relation, regardless of which relation (tight or loose) they had been familiarized with. According to Bowerman and Choi, the results show that before they speak babies can discriminate between tight and loose containment events. When the test was run on adult speakers of the two languages, the results showed that adult speakers of Korean behaved in exactly the same way, whereas adult speakers of English looked equally long at the two scenes in each test pair. That is, they showed no sensitivity to the distinction between tight and loose containment. The data suggest ‘that the distinction between tight and loose containment events, if English speakers recognize it at all, is far less salient to them than it is to Korean speakers’. This is ‘a real Whorfian effect’ (Bowerman and Choi 2003: 415).

To summarize, Bowerman and Choi investigate children’s acquisition of spatial concepts in order to establish the relative contributions of non-linguistic cognition and exposure to language. The studies focus on categorization of certain spatial events in English and Korean, and it is suggested that both non-linguistic cognition and linguistic structure are important for
the emergence of spatial concepts. The results from infants are taken to support the claim that learning the categories of their language make children form concepts they would not otherwise have had. An additional study on adults shows that the distinction between tight and loose containment events is less salient to adult English than to adult Korean speakers, and this loss of sensitivity to the distinction is interpreted as a Whorfian effect.

There is also additional neo-Whorfian work focusing on space. In the following section, a group of studies exploring the possible influence of spatial frames of reference on spatial thinking is reviewed.

3.3 Spatial frames of reference

The way spatial frames of reference are used in different communities has been the focus of several studies exploring Whorfian effects of language on cognition (e.g. Levinson 2003 and 1996; Brown 2001; Brown and Levinson 2000; Pederson et al. 1998). In these studies, it is argued that languages differ significantly as regards frames of reference, in a way that has not been known until recently. For example, there are cultures/languages in which there are no corresponding terms for ‘left’ and ‘right’. When describing spatial relations (e.g. ‘the ball is to the left of the chair’) speakers of such languages use absolute frames of reference, similar to the cardinal directions (as in ‘the ball is to the north of the chair’). Considering that spatial concepts are often assumed to be universal, these are challenging findings. In developmental psychology it has often been held that human spatial conception is universal in important respects. It is assumed that it is primarily ego-centric and anthropomorphic in nature, that is, that the coordinates are established by the verticality and the back/front of our bodies, with the additional left/right axis. Humans, with their body as origin, would then orient themselves in space using a coordinate system based on what is in front of, behind, above and below on their own body. The coordinate system may be projected onto an interlocutor or object.

In Levinson (e.g. 1996 and 2003) it is argued that this is a false picture of human spatial conception. Spatial frames of reference are not universal. There is diversity across cultures as to which frames of reference are used. Sections 3.3.1 to 3.3.4 address different kinds of frames of reference and examples of communities in which absolute frames of reference are predominant.
3.3.1 Types of frames of reference

The idea of frames of reference dates back a long time, but the phrase ‘frame of reference’ and its modern interpretation originate, according to Levinson, from Gestalt theories of perception in the 1920s. In the many disciplines (e.g. philosophy, psychology, linguistics, the brain sciences) in which the notion is employed, various distinctions have been suggested (e.g. ‘relative’ vs. ‘absolute’, ‘egocentric’ vs. ‘allocentric’, ‘viewer-centered’ vs. ‘object-centered’, etc.). In Levinson (2003) a preliminary typology is made of the frames of reference that are ‘systematically distinguished in the grammar or lexicon of different languages’. According to Levinson, there are three main types of frame of reference: ‘intrinsic’, ‘relative’ and ‘absolute’. Levinson emphasizes that distinctions between frames of reference are essentially distinctions between underlying coordinate systems, and that these should not be confused with different origins for the same coordinate system. A brief sketch of the three types of frame of reference is given below (for a full account, see Levinson 2003: 38–56).

Relative frame of reference

In the relative frame of reference, ‘objects are located in terms of viewer-centered coordinates based on body axes (left/right/front/back), as in “The ball is to the left of the chair”’ (Levinson et al. 2002: 158). The relative frame of reference presupposes a viewpoint V and a figure and ground distinct from V. The coordinate system based on a viewer, ‘seems generally to be based on the planes through the human body, giving us an “up”/“down”, “back”/“front” and “left”/“right” set of half-lines’ (Levinson 2003: 43).

Intrinsic frame of reference

In the intrinsic frame of reference, ‘the location is described in terms of the object-centered coordinates of the reference or landmark object based on “intrinsic” facets of the object, as in “The ball is at the chair’s front”’ (Levinson et al. 2002: 158). Languages differ in the way they assign such facets. For example, the front of an object may not be the same in different languages. The basis for attributing, e.g., front and back may be the shape of the object in one language, and the function in another language. Whatever the procedure in a particular language, ‘it relies primarily on the conceptual properties of the object: its shape, canonical orientation, characteristic motion and use etc.’ (Levinson 2003: 42).

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7 For a discussion of these, and references, see Levinson (2003: 25–38).
8 For a different view see e.g. Brewer and Pears (1993 in Levinson 2003).
In the absolute frame of reference the location is described ‘in terms of coordinates based on fixed bearings or cardinal directions, centered on the reference object, as in “The ball is north of the chair”’ (Levinson et al. 2002: 158). Such a spatial description is based only on fixed points outside the ground, figure and view-point. It will not change if the location of the viewpoint changes. An absolute system requires that persons maintain their orientation with respect to the fixed bearings.

According to Levinson, the relative, intrinsic and absolute are the major types of frame of reference. Within each type there is room for variation. The three types are coded in different combinations in different languages. Some cultures have all types and use them for spatial description according to the kind of situation. For speakers of English (or other European languages) the relative system is familiar and part of daily life.

[W]e live in a culture in which relative coordinates organize most of our more self-aware spatial behaviour. This dependence on directions based on viewer-centred left vs. right is built into our cultural environment in scores of ways: the directionality of writing, the sidedness of traffic, the nature of route directions, the egocentric asymmetries of consoles, table settings, doors and so forth. (Levinson 2003: 112)

But there are also languages in which absolute frames of reference are the only ones used for spatial description. One of them is Guugu Yimithirr, spoken in Northern Queensland, Australia.

3.3.2 Frames of reference in a Guugu Yimithirr community

The Guugu Yimithirr language belongs to the Pama-Nyungan family. It is most often spoken in the Hopevale Community in Northern Queensland, Australia. One of the features of Guugu Yimithirr, reported in e.g. Levinson (1996; 2001; 2003) is the use of absolute frames of reference in spatial language and the lack of relative frames of reference.

In Guugu Yimithirr […], nearly all spatial descriptions involve essential reference to something like our cardinal directions […]. In GY, in order to describe someone as standing in front of the tree, one says something equivalent (as appropriate) to ‘George is just north of the tree’, or, to tell someone to take the next left turn, ‘go north’, or, to ask someone to move over a bit, ‘move a bit east’, or, to instruct a carpenter to make a door jamb vertical, ‘move it a little north’, or, to tell someone where you left your tobacco, ‘I left it on the southern edge of the western table in your house’, or to ask someone to turn off the camping gas stove, ‘turn the knob west’, and so on. So thoroughgoing is the use of cardinal directions in GY that just as we think of a
picture as containing virtual space, so that we describe an elephant as behind
a tree in a children’s book (based on apparent occlusion), so GY speakers
think about it as an oriented virtual space: if I am looking at the book facing
north, then the elephant is north of the tree, and if I want you to skip ahead in
the book I will ask you to go further east (because the pages would then be
flipped from east to west). (Levinson 2003: 114)

A description of the layout of a room in a language like Guugu Yimithirr,
e.g. ‘the lamp is north of the sofa, with the table to the west’, will not vary
whether you look through the window or the door, whereas a description in a
language with a relative system would. For example, the lamp may be be-
hind the sofa when viewed from the door, but in front of the sofa when
viewed from the window.

The absolute system in Guugu Yimithirr is based on four root expressions
(as in western compass points) but they label edges or quadrants rather than
points. They are skewed about 17 degrees clockwise from our magnetic di-
rections. See figure 5.

![Figure 5. Guugu Yimithirr cardinal edges (adapted from Levinson 2003).](image)

The root expressions are: *gungga-* (northern edge), *jiba-* (southern edge),
*naga-* (eastern edge) and *guwa-* (western edge). They appear with various
morphological derivations. For a fuller description of the linguistic details and further references, see Levinson (2003: 115–23).
According to Levinson, there may be cognitive consequences of such linguistic patterns. For example, to describe an arrangement of model animals, an English speaker must remember e.g. that the pig was in front of the cow. The Guugu Yimithirr speaker must remember the cardinal directions of each animal, or be able to reconstruct them. That is, although the perceptual information may be identical, English speakers and Guugu Yimithirr speakers must code for memory in distinct ways.

The hypothesis is that GY speakers must take primary visual perceptions and code them together with cardinal direction information for memory. They must do this all of the time (at least for locally significant events), since one never knows in advance what memorized facts one may wish to describe. Inference on such coded memories should make use of this cardinal direction information. In short, one expects that GY speakers might behave differently in memory tasks (whether recognition or recall) and in inferential tasks compared to speakers of a language with ‘relative’ spatial description. (Levinson 2003: 124)

The arguments for cognitive consequences of linguistic patterns are made along two lines of reasoning. In the first, Levinson starts from the linguistic expressions in Guugu Yimithirr and asks what kinds of background cognitive processes that would be necessary to support such expressions. Then he explores whether such special cognitive processes seem to be utilized by the informants when they speak. The second line of reasoning concerns the nature of representation in language and cognition. The non-linguistic coding of a spatial arrangement is tested directly in specially developed non-verbal tests.

First argument: Mental map and compass

The first line of argument thus starts from the linguistic performance of speakers and asks what kind of cognitive processes that are required to support the linguistic performance. According to Levinson, there is an orientational surety among speakers of Guugu Yimithirr, who ‘invariably seem to know, day and night, familiar or unfamiliar location, whether sitting still or travelling in a vehicle, where the cardinal directions lie’ (Levinson 2003: 124). But in order to speak Guugu Yimithirr, this is not enough.

In order to say, for example, that George was standing in front of the post office in Cooktown, it will be necessary to remember (or be able to calculate) the orientation of the building and George’s location relative to that, so that we can say in effect ‘George was standing east of the post office’ […]

To achieve such descriptions one will need to know, or be able to recover, the angles subtended between any two places. In that sense a mental map of one’s world with accurate absolute angles must be accessible. One place in
that map that will be especially, but not exclusively, important will be the location of speaking, since perhaps the majority of cardinal expressions have an implicit deictic interpretation (‘north of here’). As the speaker moves, his angular position vis-à-vis other places will change. In that sense, it will be essential to **dead reckon** one’s current location – that is keep track of how far one went on each heading – in order to know what angles the current position subtends to places one might wish to refer to. (Levinson 2003: 125)

Thus, to be able to express spatial relations in Guugu Yimithirr, speakers must constantly be aware of their present location in absolute terms. In order to investigate how accurate the sense of direction really was among the informants, Levinson got his informants to point at distant invisible locations from different transitory locations. On various trips to the bush, or at halts on other journeys, a group of informants (ten men aged from thirty-five to over seventy) were asked on various occasions to estimate directions of named locations. The locations were mountains, river mouths, cattle stations etc. The distances of the locations varied from a few kilometres to several hundreds of kilometres.

The method consisted of halting at some spot with restricted visibility (e.g. amongst trees), asking the men to point to a series of locations, if possible by picking out a landmark in the direct line of sight, so that the investigator could sight through a prismatic compass. It was made plain that an accurate rather than an instant response was being asked for, but in most cases the response was within a couple of seconds […], often an immediate gesture. Later the readings were compared to the most detailed survey maps available, the location at which the questioning took place identified […], the angles between that place and the pointed-out locations measured, six degrees allowance made for the difference between magnetic and grid north, and the subjects’ errors calculated. (Levinson 2003: 126)

The average error over 120 trials from bush locations or stops on bush roads was 13.9 degrees, which is less than 4 per cent. According to Levinson, the results show that Guugu Yimithirr speakers maintain a mental map over a large terrain, about 300 by 150 km in extent. They can compute their own location within it and the direction to other locations, and estimate distance travelled by foot or by vehicle. The predictions that speakers of a language that uses absolute bearings in spatial description would know where the cardinal directions are and be able to compute their current location with respect to other locations turn out to be true for speakers of Guugu Yimithirr.

10 All Guugu Yimithirr speakers also speak English. Levinson (2003: 121), states that the Guugu Yimithirr data are gathered from a group of men, most of them between 55 and 75 years of age, ‘who would normally speak Guugu Yimithirr amongst themselves in preference to English, and who have spent their lives in close association with each other and the land of Hopevale Aboriginal mission’, and that the results may not generalize to a larger sample including both sexes.

11 For details on the results and reference to comparable data, see Levinson (2003: 127).
The results imply, Levinson argues, that in order to use absolute spatial descriptions in language a ‘mental compass’ that operates constantly in the background is required. Such a compass must be constructed during socialization and language learning, and ‘the argument will be […] that it is language (not, e.g., the environment alone) that forces this constant attention to the directional attributes of every scene’ (Levinson 2003: 129–30).

Second argument: Non-linguistic coding in memory and inference

The second line of argument is based on testing non-linguistic coding directly. The hypothesis is that speakers of Guugu Yimithirr at all times code scenes for memory with absolute directional information. The underlying reasoning is:

1. GY speakers use, and indeed (in the absence of other descriptive resources in the language) must use, absolute directions to describe spatial locations and events.

2. GY speakers may, like all of us, want to describe any experience at any time.

3. In order to be able to do so, they must have accurately remembered scenes together with their cardinal orientation, since these cannot be reconstructed from codings in a relative or intrinsic frame of reference […].

(Levinson 2003: 130)

To test this hypothesis, Levinson argues, asking people about their memories of past experiences is not enough. It is possible to show that the informants are able to give accurate spatial descriptions of events in the past, for example, by examining filmed stories about events that happened long ago. To make this point Levinson reports on a case study (Haviland 1993). In this, a man was filmed in 1980 telling a story about a shipwreck in a ketch. In 1982 Levinson filmed the same man retelling the same story. By comparing the two tellings, event by event, it was possible to show that ‘orientations are preserved across the two tellings down to the details of which way the ketch rolled over, and on which side the two men jumped out, and who was west of whom on the swim back to shore, and so on throughout the story’ (Levinson 2003: 131).

However, evidence of this kind relies on a verbal protocol, ‘– we can show that speakers can recover memories and then code them in absolute terms, but it is possible that in some way the absolute directions are reconstructed during the process of preparation for speaking’ (Levinson 2003: 131–33). That is, to be sure that it is not just a matter of ‘thinking for speak-
ing’ (Slobin 1996), one has to show that Guugu Yimithirr speakers not only speak differently about space, but also think differently about space.

In order to test whether speakers of Guugu Yimithirr really think differently about space, Levinson needed experiment tasks in which language played no role. According to Levinson, the ‘crucial difference between our own system of spatial conception and the GY one is that we constantly rotate our coordinate systems with ourselves, while they do not’ (Levinson 2003: 133). This insight, that struck Levinson when he saw somebody drawing a map ‘upside down’, generated a set of tasks based on rotation in which this property of the underlying representations could be explored without asking the informants to talk. The basic design of the rotation tasks and a possible experiment about non-verbal coding for memory is shown in Figure 6. When a subject is placed at Table 1, he sees an arrow pointing to his right. He is asked to memorize this and turn around. Looking at Table 2 he is asked to identify which one of the two arrows is most like the arrow previously seen on Table 1. As Levinson explains, if the subjects identify the arrow pointing rightwards as the arrow they saw before, they are clearly rotating the coordinate system with them. If instead they choose the arrow pointing leftwards, they have preserved the absolute direction of the arrow on Table 1, and are thus not rotating the coordinate system with them.

This kind of test can be varied in many ways. In the test described above, recognition memory is tested. If the subject were asked to place an arrow on table 2 in the direction seen on Table 1, this would test memory for recall, which is another aspect of memory. A series of tasks along this line of reasoning were developed.

The Hopevale tasks were run in a pair of rooms that were interconnected, and arranged so that they were rotations of one another. See figure 7.

From the interconnecting door, each room visually presented the identical scene, with the desk at the right-hand side on the far wall and one desk facing north, the other facing south.

The passage between one desk and the other, around the existing furniture, took approximately 30–45 seconds, so that, together with verbal instructions, about one minute passed between a subject seeing a stimulus set on one table and the corresponding set on the other table. This setting gave the minimum environmental encouragement to thinking in terms of cardinal directions, compared, for example, to carrying out experiments in the bush or on the beach, and the rotational matching of the rooms gave a definite bias towards thinking in relative terms, for example in terms of left and right. Thinking in terms like ‘towards the bed’ or ‘towards the cupboard’ in such mirror-image settings would also yield the same results as thinking in terms of left and right. (Levinson 2003: 134)
In order not to prejudice the results, Levinson gave considerable thought to the instructions, which did not contain any directional expressions.

In the event, all instructions were given in English, and the subjects therefore responded in English where a verbal response was requested. This minimized any possible residual effect of ‘thinking for speaking’ in GY [...], even though the main task set to informants was non-verbal: for the most part, they had merely to indicate what they previously saw by pointing. (Levinson 2003: 134–5)
In this setting, a number of tasks were performed. Later, similar experiments were run on a Dutch comparison group in a similar setting in Holland.\textsuperscript{12} The results showed that the two groups solve the tasks significantly differently. The Hopevale informants mostly coded in absolute terms while the Dutch informants coded almost uniformly in relative terms. Despite weaknesses – small samples and few trials – in the design, Levinson argues that the results do suggest that speakers of Guugu Yimithirr (at least of an older generation) not only speak a language ‘that as a prerequisite requires storage and computation of orientation and absolute directions’, they can also be shown ‘when not engaged in speaking the language to think in a way that is concordant with it’ (Levinson 2003: 145).

According to Levinson, the results seriously challenge the view that linguistic spatial categories directly reflect innate concepts, and also suggest that more than just ‘thinking for speaking’ must be involved.

\textsuperscript{12} For a fuller description of this and other types of tests, see Levinson (2003 and 1997).
Rather, the fact that GY provides an absolute system and no system of relative description seems to have knock-on effects: speakers must remember spatial dispositions in the absolute terms which will allow them to later code them in the language. Spatial memory will then determine an absolute mode of spatial inference. Absolute coding in both memory and language in turn requires a constant, background ‘dead reckoning’ of current heading and position, which our pointing experiments appear to have tapped directly into. Language, gesture, cognitive style, and many aspects of spatial behaviour, come to form a coherent and distinctive complex. The system constitutes an intellectual achievement of the first order, and one of the central surviving features of a culture under prolonged erosion, which connects to that enduring traditional preoccupation of Australian Aboriginal peoples, the landscape and its hidden meanings. (Levinson 2003: 145–46)

Guugu Yimithirr is just one example of an ‘absolute language’. In the following section an ‘absolute community’ from another part of the world is described, the Tzeltal speaking community of Tenejapa.

3.3.3 Frames of reference in a Tzeltal community

The Tzeltal language, spoken in Tenejapa, Mexico, is another example of an ‘absolute’ language. The Tzeltal community is very different from the Guugu Yimithirr community but the two languages are similar in certain respects. Like that of Guugu Yimithirr, Tzeltal’s spatial vocabulary is dominated by an absolute system of spatial reckoning. An intrinsic frame of reference is used when a located object (the figure) and a reference point (the ground) are in direct contact, but in most cases where they are separated in space, the absolute system is used.

The Tenejapa territory forms an incline from high south to low north (cut by deep valleys). To talk about spatial relations on the horizontal plane the Tzeltal speakers use an uphill/downhill coordinate system abstracted from the landscape, both for small-scale and long-distance space. The system resembles a cardinal direction system, with UP equated roughly with south, and DOWN equated roughly with north, and there is no projective front/back/left/right system.

The same vocabulary used on the horizontal axis applies to spatial relations on the vertical axis. The system also has an axis transverse to the ‘uphill/downhill’ (roughly south/north) axis, which is undifferentiated at the two ends. The directions are designated ‘ajk’ol “uphill (roughly south)”, alan “downhill (roughly north)”, and jejch “across (either east or west)” (Levinson 2003: 145–46).

13 What is referred to as ‘Tzeltal’ in Levinson (2003) and in the present thesis is a dialect of Tzeltal spoken in Tenejapa.

14 For further details on the Tzeltal spatial system see e.g. Brown (2001), Brown and Levinson (2000), and Levinson (2003).
son 2003: 148). In these terms then, the ball in figure 8 is ‘uphill’ (south) of the chair.

Figure 8. Tzeltal uphill/downhill system (adapted from Brown 2001).

To use this absolute system in an adult-like way thus requires complex cognitive abilities. Speakers must maintain ‘absolute orientation at all times, so that they always know where “uphill” and “downhill” are, even at night and in unfamiliar places’ (Brown 2001: 516). Apart from this cognitive complexity there is a semantic complexity of the UP/DOWN vocabulary. The same vocabulary that is used on the horizontal applies on the vertical axis. When people say the equivalent of ‘X is uphillwards of Y’, they can mean either vertically or horizontally along the axis abstracted from the landscape, roughly south/north. Additionally, the ‘uphill/downhill’ axis may be ab-
stracted from the local slope even when this deviates from the south/north direction.

Levinson (2003) discusses the possible cognitive consequences of this absolute system. After many years of investigation of the language, culture and interaction of Tzeltal speakers of Tenejapa, Levinson had noted details of behaviour and response that ‘suggest that these language patterns are echoed in unconscious non-linguistic thought and behaviour’ (Levinson 2003: 151).

According to Levinson, the Tenejapans seem to have the same sense of direction as the Guugu Yimithirr speakers of Hopevale, a ‘mental compass’. Like the Guugu Yimithirr, they can point to known locations when randomly questioned, although not with the same accuracy.

In order to investigate non-linguistic memory and inference, Levinson presented non-verbal tasks based on the rotation paradigm to speakers of Tzeltal and speakers of Dutch. The tasks were designed to ‘probe for the nature of non-linguistic spatial representations – and specifically just the difference between a relative and absolute coding’ (Levinson 2003: 155). To make sure that the instructions for the experiments did not contain spatial information, thereby suggesting one or another frame of reference, the instructions were of the kind, ‘Point to the pattern you saw before’, or ‘Re-make the array just as it was’. Like in the Guugu Yimithirr experiments, the informants were shown a stimulus on a table, then rotated 180 degrees and led to another table, where the response was required. For example, in a test of recall memory, the stimuli consisted of a set of model animals, arranged on Table 1. After a short delay informants were turned to Table 2 and asked to rebuild it ‘exactly as it was’. All the experiments were run on mixed-age and mixed-sex groups of informants. Like in the previously described experiments, the hypothesis being tested was that there is congruence between the frames of reference in language and those used in memory and inference. That is, it was expected that the Dutch speakers would use the relative frame of reference in memory and inference, while the Tzeltal speakers were expected to use the absolute frame.

Overall, the results from the Tenejapan experiments all point in the same direction, Levinson argues. While Dutch subjects use a relative conceptual coding in terms of notions like ‘left’, ‘right’, ‘in front of’ or ‘behind’, to solve the non-verbal tasks, the Tenejapan subjects predominantly use an absolute coding system. This is ‘congruent with the coding built into the semantics of spatial description in the two languages’, which suggests that there is ‘a tight correlation between coding in language and coding in non-linguistic memory and reasoning’ (Levinson 2003: 168).

However, although Tzeltal and Guugu Yimithirr both use predominantly absolute frames of reference, there is an important difference between them. In Guugu Yimithirr there are four root expressions, corresponding roughly to north/south/east/west. In Tzeltal there are expressions corresponding roughly to south and north, but the east/west axis is undifferentiated at the two ends,
and east and west are thus coded identically, as ‘across’. Levinson (2003: 206–10) suggests that this lack of distinction might be visible in the responses. If the Tzeltal linguistic coding system is closely isomorphic to the coding system for non-linguistic tasks, then ‘we might expect errors to accrue on the undifferentiated east–west axis in non-linguistic coding tasks’. The results of the tests showed that the informants indeed made more errors on east/west axis tasks, that is, the absolute performance was strongest on the north/south axis. After modifying the experiments in order exclude the possible influence of an egocentric front/back axis, Levinson was able to draw the conclusion that ‘the main factor determining variable Tenejapan performance is the strong vs. weak absolute axes’ (Levinson 2003: 207). The results of these experiments show that there is a systematic isomorphism between the linguistic coding system and the non-linguistic representation of spatial arrays, Levinson argues. Just where the linguistic representation is underspecified, there is a lack of precision in non-verbal coding, and this ‘telling little detail is amongst the most powerful kind of empirical argument we have for a linguistic source for non-verbal spatial representations’ (Levinson 2003: 210).

In order to gather more evidence for the hypothesis that frames of reference in language correlate with frames of reference used in thinking, Levinson (2003) examines data from a larger cross-linguistic sample. The results are reviewed in the next section.

3.3.4 Frames of reference in a large cross-linguistic sample

In this large cross-linguistic and cross-cultural sample, the spatial frames of reference used in a number of speech communities are established. Subjects from the communities are then tested in order to see whether the spatial coordinates they use to solve non-linguistic tasks are consistent with the language they speak. The hypothesis is that ‘where the conventions of the language dictate the predominant use of either an absolute or a relative frame of reference for descriptive purposes, the same frame of reference will be employed by speakers of that language to solve corresponding non-linguistic tasks’ (Levinson 2003: 171). The alternative hypothesis, ‘probably the basic working assumption in cognitive science circles’, according to Levinson (2003: 171) would be that universal properties of human spatial cognition, ‘dictated by a common biological inheritance, should lead speakers of different languages to converge on a single kind of spatial coordinate system in memory and reasoning’. After establishing a correlation, Levinson turns to the question of causation and whether there might be other possible factors influencing coding strategy.
The cross-cultural sample includes non-western language communities in e.g. Middle America, southern Africa, and Papua New Guinea. Subjects from seventeen cultures, most of them small-scale communities, were presented with linguistic tasks systematically exploring frames of reference. From these it was possible to collect data from uniform cognitive tasks in thirteen populations. The languages were classified according to the frames of reference that were available in the language, and to the frames of reference that were preferred in the language. After that, two groups of languages were extracted according to the preferred frames of reference. Based on this linguistic division into two types of languages, subjects were divided into one group of ‘absolute linguistic coders’ and one group of ‘relative linguistic coders’. All the experiments were also run on a group of Dutch speakers.

In order to be able to compare performance on non-linguistic spatial tasks by subjects who ‘(a) are employing quite different conceptual parameters (i.e. solving the tasks in different ways), (b) display varying levels of consistent performance across cultures, (c) exhibit differing levels of variation within cultures according to social or cultural variables of one kind or another’ (Levinson 2003: 173), a gradient measure of performance was introduced. This measure, called the RA gradient (relative-to-absolute gradient), is composed out of three possible outcomes of each trial, ‘absolute’, ‘relative’ and ‘untypable’, and ‘aims at giving an estimate of the absolute tendency of an individual or a sample’ (Levinson 2003: 176). Every absolute response is given the value 1, every relative response is given the value 0, and every untypable response is given the value 0.5. If a person then performs a test with six trials and produces three clearly relative solutions, one absolute and two untypable ones, the RA gradient for this informant is (3*0+2*0.5+1*1)/6=0.33, which means that he or she is an inconsistent coder towards the relative end.

The study focuses primarily on the opposition between the relative and absolute frames of reference. Five different non-verbal tests similar to the tests described in sections 3.3.2 and 3.3.3 were run on speakers of languages where either relative or absolute frames of reference are predominant. According to Levinson (2003: 185) the outcome of the tests confirms the predictions and suggests that ‘there is a highly reliable difference in non-verbal behaviour between the two groups formed on linguistic criteria […], for every task for which we have adequate data, the patterning is in the direction predicted by the hypothesis that the frames of reference in language correlate closely with those used in non-verbal memory and reasoning’.

Since the two large groups consisted of groups of people living in different places with different cultural backgrounds, pairwise comparisons were made to test for differences within the larger groups. The results of these
comparisons were consistent with the previous results, that is, any two communities using the same linguistic frames of reference showed similar non-linguistic performance.

*Other possible factors for non-verbal coding strategy*

The pairwise comparisons were made between groups of people from the same country or region, and may be regarded as a more restricted test of the linguistic determinism hypothesis, ‘as both groups live, say, in the same nation state and share many aspects of ecological environment and cultural tradition, yet differ in the critical linguistic feature in question (communication conventions for either absolute or relative coordinate systems in language)’ (Levinson 2003: 188). For example, three groups in the cross-linguistic sample speak Mayan languages – Tenejapan Tzeltal, Mopan and Yucatec. The three languages differ in their use of spatial frames of reference. Tzeltal is predominantly absolute, Mopan is predominantly intrinsic, and in Yucatec all three frames of reference are used. Although there are ecological differences between the areas where the languages are spoken, all three cultures have ‘very similar material culture and the same subsistence base’ (Levinson 2003: 189). On the non-linguistic tasks which require an absolute or relative frame of reference to solve, Tzeltal speakers made absolute responses, while subjects from the other two groups behaved more or less randomly, as would be predicted from their predominant frames of reference. Thus, although the three groups share material culture and subsistence base, the response patterns diverge in a way that corresponds to the frames of reference used in each language. Such cases may, according to Levinson, ‘help us be more confident that language is the key determinative factor in the different non-verbal coding tendencies’ (Levinson 2003: 188).

Levinson also reports on similar comparisons between two groups of Tamil speakers in Madurai district in Tamilnadu (e.g. Pederson et al. 1998). Tamil-speaking informants were divided into two groups according to what linguistic frames of reference they used in language. One group, essentially speakers of a rural dialect, used predominantly absolute coding in language. The other group, mostly speakers of urban dialects, used predominantly relative coding in language.

According to Levinson, the two populations share most of the material and cultural background. The same non-linguistic tasks were run across the two samples. Although there was mixed evidence from the two groups, the results from the tests are ‘sufficient to characterize both groups as being distinct’. From the Mayan and the Tamil cases Levinson concludes that there is evidence ‘that ecological factors, or factors to do with material culture, or indeed religion or other cultural variables, do not seem to have a decisive role to play in non-verbal coding’ (Levinson 2003: 190–91).
To further exclude factors other than language underlying the correlation between linguistic and non-linguistic coding, Levinson examines e.g. gender, literacy and age. Testing for gender differences revealed results in a few samples, although none of them were significant. Age as a possible factor is investigated against the background of cultural change. Many of the communities in the cross-cultural survey are small ethnic groups under growing pressure of acculturation. It is argued that younger people might have adapted more to the predominant coding tendencies in the larger communities around them. However, no effects of age were found in the samples. Literacy may have many important cognitive effects, Levinson argues. Writing systems with left-to-right or right-to-left writing order, and mirror-image discriminations between letters like, for example d and b, might induce a sensitivity to left/right distinctions and thus to egocentric relative coordinates, according to Levinson. Differences correlated with literacy were found in only two samples, Tamil and Belhare, where literacy is also associated with close interaction with relative coders from other communities. Despite a modest effect of literacy in two samples, Levinson concludes that none of the factors, gender, literacy, age or cultural conservatism, have any major effect on non-verbal coding.

There seems to be overwhelming evidence then, that languages do differ as to the use of spatial frames of reference, and there also seems to be a correlation between linguistic categories and response in non-verbal tests. The results are taken to support some kind of Whorfian effect. In the following section, a summary of the argumentation is presented.

3.4 A summary of the arguments for linguistic relativity

In Sections 3.1 to 3.3, several examples of neo-relativistic reasoning have been reviewed. There are many aspects of language and thought, and the studies above all have different foci. Consequently, they argue for slightly different things. However, to a large extent the case studies argue against universalist proposals of a ‘psychic unity of mankind’, although e.g. Bowernan and Choi, and Levinson do not exclude the possibility of universals at some level.

The studies all have in common that they take findings of correlation between semantic and cognitive categories as evidence for a causal relation from language to thought. The causal relation is argued for in several steps. In some studies the arguments are more elaborate than in others, but they all begin with the description of linguistic structures in at least two languages. Predictions of possible cognitive consequences are then made. What kind of thinking is needed to speak a particular language? What, in terms of non-linguistic cognition, is required in order to speak the languages? Next, the
non-linguistic thinking is tested directly in non-verbal tests. The outcome of these tests suggests that speakers of different languages perform differently in the non-linguistic tasks, and that the response patterns correspond to linguistic patterns.

This is formulated as a correlation between categories in language and categories in thinking. In different manners, the studies argue that the correlation may be interpreted as a causal relation, with language as the dominant factor. Some studies account for the mechanism by which language is supposed to influence thought and thereby formulate specific versions of the relativity hypothesis. For the purpose of the present study, a closer look at the argumentation for a causal relation is necessary. What view of language and thought and culture forms the basis for the studies? In the following I will summarize and comment on each step of the argumentation.

3.4.1 Studying language and thinking separately

The purpose of the neo-Whorfian studies is primarily to challenge universalist claims about human cognition. Levinson (2003: 169) states that an investigation of linguistic relativity starts from the assumption that ‘the relation between linguistic categories and non-linguistic thinking cannot be presumed to be one of identity as in so much theorizing in, for example, cognitive linguistics’. In order to reveal the nature of the relation between linguistic and non-linguistic categories, empirical investigation is required, he argues. In this investigation, ‘language’ and ‘thought’ must be examined separately, a point which is also made by Lucy (1992a, b and 1997). Linguistic relativity is not the same as linguistic diversity, Lucy argues. The linguistic differences must be related to thought. And, linguistic relativity is not the same as any influence of language on thought. ‘Without the relation to differences among languages, we just have a common psychological mechanism shared by all (an effect at the semiotic level)’. Further, linguistic relativity is not the same as cultural relativity, ‘which encompasses the full range of patterned, historically transmitted differences among communities’ (Lucy 1997: 295)

That is, the neo-Whorfian hypothesis concerns two variables, one linguistic and one cognitive, that must be examined separately. The linguistic variable may be grammatical or lexical properties of ‘a particular language’, and is distinguished from thought. Further, the two variables (particular languages and non-linguistic thought) are the only ones relevant to the hypothesis, whereas ‘culture’ for instance is not of importance. ‘Language’ is examined by describing the relevant features of one or more languages, e.g. spatial vocabulary or number marking system. ‘Thought’ is examined through non-verbal tests in which the subjects do not speak or listen to speech.
3.4.2 Establishing a correlation

After identifying contrasting patterns in grammar or vocabulary in the two or more languages, the cognitive requirements for using the grammars/vocabularies are investigated. Based on the linguistic descriptions, predictions are made about speakers’ non-linguistic thinking. For instance, given the fact that absolute frames of reference are predominantly used in the Guugu Yimithirr and the Tzeltal languages, it would be expected that speakers of these languages use absolute frames of reference even when they are not speaking. Similarly, given the number marking system in Yucatec, one would expect Yucatec speakers to classify objects according to material rather than shape. This non-linguistic cognition is tested directly in non-verbal tests. Subjects are asked to sort objects or remember the order of objects in an array, for example. The results of the non-linguistic tests are found to correspond to the linguistic patterns. From all the studies there seems to be evidence that languages differ as regards grammatical/lexical structure and that speakers of different languages react to stimuli in the non-verbal tests in a way that corresponds to the patterns of their language. There is thus a correlation between the categories of a language and speakers’ response to non-verbal tasks.

3.4.3 The variables of the correlation

The linguistic variable in the correlation consists not of the linguistic forms themselves, but their meaning. In Lucy (1997: 292) the question is put whether ‘quite different morphosyntactic configurations of meaning affect thinking about reality’. Levinson (2003: 19) argues that ‘Languages just do turn out to use fundamentally different semantic parameters in their categorization of spatial relations’. Thus, the linguistic variable, which is presumed to correlate with the cognitive variable, is described as consisting of patterns of meaning separate from thinking.

These ‘configurations of meaning’ are discussed as inherent in particular languages like English, Dutch or Guugu Yimithirr. A language appears to be an established system shared by the members of a community. Language in Levinson (2003: 290) ‘is a public, shared, cultural representation system at the same time that it is a private, internal representation system’. When a certain kind of activity is discussed, for example a Guugu Yimithirr speaker calculating his current position in relation to some other place, the frames of reference that are used in this practice are primarily seen as properties of Guugu Yimithirr and are not primarily related to this kind of practice. The speaker performs the calculation because he is a speaker of Guugu Yimithirr, not because he is engaged in a certain practice. By focusing on the language
as a fixed system rather than on what is done with language, the specific kinds of frames of reference may be regarded primarily as features of languages, and not of cultural practices. Similarly, the thinking and behaviour that are measured in the non-verbal tests are considered non-linguistic. That is, they do not belong to language. This division into linguistic and non-linguistic follows from the hypothesis of a causal relation between language and thought.

Thus, semantic distinctions and cognitive distinctions are defined as two separate variables that are correlated. Linguistic meaning and non-linguistic thinking are examined separately, and the results are interpreted without reference to the situations in which language is normally used.

Even though the results point in the direction of a correlation between linguistic and cognitive categories, this is not the same as causation. The next step is to argue for a causal relation, that is, that it is language and not e.g. ecological or cultural factors that influences cognition.

3.4.4 Establishing a causal relation

That correlation between two variables does not imply causation is a well-known fact. The cognitive differences suggested by the non-verbal responses were predicted on the basis of linguistic patterns. However, although there seems to be evidence that speakers of English and Yucatec attend to different properties in objects, that speakers of Guugu Yimithirr and Tzeltal have a ‘mental map and compass’, and that speakers of Korean attend to loose-fitting vs tight-fitting relations in a way that English speakers do not, it is still not possible to conclusively state that these cognitive facts are caused by linguistic facts. Generally, correlation between data from two variables A and B is not enough to establish the direction of causality between the variables, or whether there is a third factor C responsible for the results. By way of reasoning and reflecting on relevant facts, one must find the most plausible explanation of the correlation.

In Bowerman and Choi (2003) and McDonough et al. (2003), the fact that adult speakers make non-verbal distinctions that correspond to the language patterns is taken to be enough evidence for linguistic relativity. Lucy and Gaskins admit that correlation is not enough to establish causation, but they argue that several factors converge to suggest that language is the organizing force in the correspondence between language and thinking. For example, the language patterns allow prediction of cognitive patterns but not vice versa. The grammatical patterns allow us to predict both ‘global cognitive differences (e.g., relative overall attentiveness to number or material across a range of stimuli) and local patterns of response as a function of grammatical distinctions among referent types’ (Lucy and Gaskins 2003: 482). Lucy and Gaskins argue that such precise prediction could not be made only from
knowledge of the stimuli and the tasks, or knowledge about what sorts of cognitive responses that are ‘natural’ to humans. As another possible explanation they suggest that these very specific response patterns are somehow ‘shaped by other aspects of culture and then the language patterns fall into place’ (Lucy and Gaskins 2003: 482). However, the argument that the developmental results contradict this view, because 7-year-olds show the language contrast before they show the cognitive contrast, and ‘it is not at all clear what cultural factor(s) would explain just this pattern of results across referent types’ (Lucy and Gaskins 2003: 482).

Referring to Imai (2000) and Imai and Mazuka (2003) who make an assessment of shape and material preference among Japanese and English speakers, Lucy and Gaskins state that the argument for the primacy of language rather than culture is supported by their evidence. Japanese is similar to Yucatec in that it rarely marks plural and obligatorily uses classifiers in count constructions, but it is associated with a markedly different culture. Considering the similarities between Japanese and Yucatec it would be expected that Japanese speakers would perform more like Yucatec speakers, that is, show a relative preference for material over shape. Although the stimuli, tasks and goals of the Japanese study were quite different, the relevant results were very similar, Lucy and Gaskins explain. Japanese speakers showed a relative preference for material when compared with English speakers performing the same task. Considering the substantial cultural differences, as well as task and procedural differences, the results conform well to the predictions based on the grammatical analysis and ‘lend further credibility to the argument that language is the decisive factor’ (Lucy and Gaskins 2003: 483). In Lucy (1992b: 85), it is stated that ‘it is not possible with correlational techniques to establish unequivocally that language is the shaping factor […]; the language patterns may in fact derive from culturally specific thought patterns, or both patterns may derive from some third cultural factor’. But, Lucy continues, correlational evidence can be ‘extremely suggestive of a causal role for language if the relationships are strong and distinctive and if no other explanation for the contrasting cognitive patterns seems plausible’.

Levinson (2003) examines various possible alternative factors that might be responsible for non-linguistic coding patterns, but finds that none of them seem to have a role to play in non-verbal coding. To definitively solve the chicken-and-egg problem Levinson (2003: 211) argues as follows:

If one variable A correlates with a variable B, this might mean that A determines B, or that B determines A, or that there is an independent factor C that determines both A and B. The evidence from cross-cultural comparisons suggests that there are fundamental differences between populations as regards use of frames of reference in language. The results of the non-linguistic tests suggest that there are cognitive patterns that correspond to the linguistic patterns. That is, the data point to a correlation between language
categories (LC) and cognitive coding (CC). Which one is determining the other? Levinson is entertaining the hypothesis that LC is determinative of CC. If one were to assume instead the inverse alternative, that CC determines LC, this would, according to Levinson, amount to the claim ‘that cognitive coding style is the dominant factor and is merely reflected in language’. In that case, considering the differences in cognitive style between speakers of different languages, how could we explain that all members of a community come to share a locally predominant CC? That is, if CC is the dominant factor, one has to explain how, in different communities, distinct cognitive styles develop, and how they come to be shared by all members of the community. According to Levinson, there are a few distinct possibilities:

1. There is human genetic diversity in this domain;
2. Some third factor – say, climate or ecology – induces a distinct CC in the local population;
3. The local population converges through communication.

(Levinson 2003: 212)

The first alternative is extremely unlikely, Levinson states. For example, there are closely related populations where distinct cognitive coding styles are employed, like the Mayan populations mentioned above. The second alternative, that some third factor like ecology induces a certain cognitive coding style, is also ruled out. There is nothing to suggest that, for example, people who live in the ‘big outdoors’ tend to be absolute coders. Several possible third factors such as literacy and gender, or other cultural factors like driving regulations or asymmetries in car design, or built-in left/right asymmetries in the environment are also considered and dismissed. According to Levinson, when most other variables – such as culture, climate, or major language type – are held constant, but the relevant linguistic factors vary, the non-verbal coding reflects the linguistic pattern (which is suggested by the Tamil comparison). Now the third alternative remains, namely that ‘populations converge on a particular non-verbal coding strategy largely because they have learnt to do so by communicating with each other’ (Levinson 2003: 213). This is by far the most likely explanation, Levinson argues. Language is the most complex and highly practiced semiotic system that humans use and the most crucial in human development. It seems inevitable then, that we must conclude ‘that it is language above all that drives the convergence between linguistic and non-linguistic coding of our spatial world’ (Levinson 2003: 213). I shall return to this line of argument in Chapter 5.
Apart from this argument about correlation vs. causation, we have seen that Levinson suggests that there is in fact a small piece of direct evidence for the causal direction from language to cognition ‘namely the finding that in Tenejapa just where there is a linguistic weakness in the coding system (a partial conflation of east and west axes), so there is a greater fallibility on the east–west axis in absolute coding in non-linguistic tasks’ (Levinson 2003: 214).

Thus, the correlation between linguistic patterns and response patterns from the non-linguistic tasks, is interpreted as a causal relation. Various alternative factors such as ecology, literacy or ‘culture’ (as in ‘Japanese culture’ vs. ‘Yucatec culture’) are examined but not found to have an influence on cognition. The conclusion is drawn that linguistic structures most likely are what cause cognitive diversity. The next section deals with the mechanisms for the influence of language on thought.

3.4.5 Explaining the mechanisms behind linguistic relativity

So far, the arguments for correlation and causation have been summarized. The present section is concerned with how and where the influence of language on cognition takes place. The most detailed account of the mechanisms involved is given by Levinson.

Levinson (2003: 214) suggests a model of ‘partial constructivism’ in which ‘language selects one or more types of frame of reference from a set incipiently available in the sensory modalities, constructs particular realizations or distinctive tokens of those types, and thus partially constructs a system’. He emphasizes that his formulation of linguistic relativity is not Whorfian in any strict sense. Frames of reference are as much lexical as grammatical, he argues, and are not the obligatory grammatical patterns of background character that Whorf described. Further, according to Levinson, Whorf imagined the influence of language on thought ‘to inhere in an entrainment of “habitual thought”, as if unreflective language use would set up inescapable categories and analogies’ (Levinson 2003: 301).

Levinson’s own argument is not based on such entrainment, but on the ‘architecture’ of the mind.

The argument is an architectural one. Language is an output system. The output must meet the local semantic requirements. Consequently, the input to language production must code for the right distinctions. As a consequence of that, scenes must be memorized complete with the relevant features. In order to code for those features, subsidiary processes must run – for example, to code for fixed bearings, a mental ‘compass’ must compute directions. An indirect consequence of coding for particular features is that inference will be done over those features. And other output systems like gesture will reflect the same coding of features in memory. So, given the architecture of the sys-
tem, once one puts serious semantic constraints on the output, the rest of the system will be forced to support, code and operate on those features. And so the imprint of language-specific categories will run deep in cognitive processes. (Levinson 2003: 301)

As for the nature of the non-linguistic cognitive representations of space, Levinson argues that spatial processing involves a number of different representation systems. There is a ‘complex layering of spatial representation systems, driven initially by specific input/output systems (the senses, communication and action systems), but with many further internal layers of processing with their own internal representations’ (Levinson 2003: 286). These representations themselves have restricted exchange relations with other representations. The predominant frame of reference in a language penetrates all the way through these ‘inner languages’. According to Levinson (2003: 290), language has ‘an interstitial status’, it is a ‘public, shared, cultural representation system at the same time that it is a private, internal representation system’. And ‘choices made at the cultural, external, variable level come to ramify right through our inner representational systems’.

One major reason that frame of reference ramifies right through in this way is that there is no automatic translation between absolute and relative frames of reference. From a proposition of the kind ‘A is to the right of B’, there is no way to compute ‘A is north of B’ without additional information. According to Levinson, frames of reference are reflected not only in non-verbal tests but also in pointing and gesture. When he looked at pointing and gesture, he found the same picture:

speakers of a language in which the absolute frame of reference is dominant can accurately point at unseen places, and they do so routinely in conversation, while speakers of other languages do not appear to be able to do this. (Levinson 2003: 281)

The relation between the categories of language and the categories of thought is not such that they may be equated, Levinson states. Referring to Langacker (1987) and Jackendoff (1983), he argues that both extreme Whorfians and cognitive linguists are wrong to suppose that we think and speak using the same kinds of conceptual categories, although there are reasons to believe that they must be rather similar. Levinson suggests a dual level theory of ‘lexical decomposition’. At one level lexemes are decomposed into semantic primes or atomic primitives. At another level, at which we habitually operate, we have unitary lexemes. Such a theory allows for universals at the atomic level and Whorfian effects at the higher level, Levinson (2003: 300) argues. Since the high-level concepts – ‘the sort of thing packaged in lexical meanings’ – differ from language to language, and this is the level at which we run much of our normal thinking, Whorfian effects are possible. On the other hand, we are not prisoners of the high-level concepts since they
can be unpacked into their component low-level concepts when needed. Such a dual-level theory ‘allows us to consider seriously the possibility of Whorfian effects of language on cognition while simultaneously hanging on to the fundamental “psychic unity of mankind”’ (Levinson 2003: 300). Thus, Levinson is not ruling out the possibility of universals at some level. Levinson does in fact make the universal claim that there are at most three frames of reference which all languages draw upon (see Chapter 3). However, within each type there are variants which allow for Whorfian effects. Similarly, neither Lucy and Gaskins, nor Bowerman and Choi preclude the presence of pre- or nonlinguistic biases or universals.

To summarize, the neo-Whorfian studies reported in the present thesis investigate the hypothesis that patterns in a language (grammatical or lexical) may influence how speakers of the languages think (about space or objects). By making linguistic descriptions, cognitive predictions, and testing non-linguistic cognition, they argue for a correlation between linguistic patterns and cognition. By comparing communities with similar language patterns but different cultures (e.g. Yucatec and Japanese), or communities with similar cultures but different language structures (e.g. Tamil), they rule out other possible factors such as e.g. ‘culture’ and argue for a causal relation between language and thought. The linguistic variable is defined as the meaning of forms, which places linguistic meaning within the particular languages. Linguistic meaning is taken to be supported by cognition and apparently has little to do with how and in what situations the expressions are used. The thought variable is defined as non-linguistic thinking of different kinds (e.g. memory, inference, object classification). The account of the influence of language on thought focuses primarily on language systems, both as cognitive representations and as public, shared systems. The use of a language ‘forces other systems to come into line in such a way that semantic parameters in the public language are supported by internal systems keeping track of all experience coded in the same parameters’. That is why an absolute speaker ‘can hardly fail to run a specific kind of dead reckoning system, constructing oriented survey maps’ (Levinson 2003: 291).

In Chapter 5, I return to the arguments for an influence of linguistic patterns on thought, and further investigate the assumptions about language, thought and culture that seem to underlie the neo-Whorfian studies. Before that, the next chapter reviews a few contributions to the on-going debate on linguistic relativity.
In this chapter, I provide some overview of the debate on linguistic relativity, especially neo-Whorfian studies, that has been going on over the past decades. The chapter does not cover every contribution to this debate, but does provide examples of various kinds of reasoning that oppose the linguistic relativity hypothesis. Li and Gleitman (2002) and Munnich and Landau (2003) approach the relativity issue from the position that concepts are to a large extent innate, and that language merely reflects them. They find no support for the view that language shapes non-linguistic cognition, neither in their own work, nor in the neo-Whorfian studies. Everett (2005) agrees on the diversity of language and of culture and cognition. However, he reverses the direction of causality and suggests that language is shaped by culture. Greiffenhagen and Sharrock (2007) approach the relativity hypothesis from a different angle, and question several assumptions about language that the hypothesis is based on.

In the following section, empirical evidence against the influence of language on non-linguistic thought is reviewed.

4.1 Non-linguistic thinking is not affected by language

Li and Gleitman (2002) approach the results of neo-Whorfian studies from a universalist angle. According them (2002: 266), it is possible to suppose that linguistic categories and structures are ‘more-or-less straightforward mappings from a preexisting conceptual space, programmed into our biological nature’. That is, humans invent words that label their concepts. This would account for ‘the fact that the grammars and lexicons of all languages are broadly similar’. From this position, Li and Gleitman set out to explain the fact that languages also differ, and to investigate the possibility that languages influence thinking, as the neo-relativists claim.

Their point of departure is a group of neo-Whorfian studies concerning the relationship between spatial language and spatial reasoning, e.g. Pederson et al. (1998), Brown and Levinson (2000), Gumperz and Levinson (1996a), which suggest a causal relation between linguistic patterning and spatial reasoning strategies. Although Li and Gleitman admit that the neo-
Whorfian results document ‘a powerful correlation between speaking a language classified as absolute by elicited speech measures […] and solving the rotation problem absolutely’ (Li and Gleitman 2002: 272), they argue that there are several ways the correlation can be interpreted. Their purpose is to add new empirical evidence that might help in ‘evaluating the direction of causal flow from which these correlations might arise’ (Li and Gleitman, 2002: 268). In their opinion, it would be just as possible to ‘interpret the correlation in reverse; namely, that culturally differing spatial reasoning strategies lead these groups to deploy different terminologies, those that are consistent with their reasoning’ (Li and Gleitman 2002: 272). It is also possible, they argue, that some third factor that differs for the populations causes both linguistic difference and difference in approach to the spatial tasks. Because ‘linguistic and cultural practice are so often and usefully intermeshed, it is difficult to tell cause from effect’ (Li and Gleitman 2002: 272). To establish whether the neo-Whorfian conclusion of a direction of causality from thought to language is right, Li and Gleitman made their own experiments, based on similar non-linguistic tasks.

The strategy that Li and Gleitman employ to investigate the thought and language relationship is to keep the ‘language variable’ constant, that is, to use only English-speaking subjects, and vary the environment in which the subjects solve spatial tasks. They use a form of rotation task developed by Pederson et al. (1998), referred to as the ‘Animals in a Row’ test, in which the subjects are first asked to study an array of toy animals on a table and then to recreate the array from memory. According to Li and Gleitman, the populations in Pederson et al. were all tested in different spatial environments, and therefore there may have been two factors varying at the same time, language and the environment in which the tasks were solved.

For example, the Tenejapan group was tested outdoors, on its hill. The Dutch group was tested indoors in a laboratory room. According to Li and Gleitman, variations in landmark information rather than language, may have caused the differences in outcome. Two experimental studies of spatial reasoning were performed. The subjects were all chosen from a group of monolingual English-speaking university students. The purpose was to investigate if it is possible to make monolingual English speakers shift between the egocentric and allocentric strategies by systematically manipulating the circumstances in which the rotation tasks were solved.

In a first task, subjects from the group were tested in order to classify their language. A test referred to as the ‘Man and Tree test’ (developed by Pederson et al. 1998) was used to identify usage preferences as regards spatial vocabulary among the subjects. It was concluded that their language (English) is a relative language, at least for the type of language practice involved in the ‘Animals in a Row’ test.

After classifying the language as relative, the ‘Animals in a Row’ test was administered in different environments on groups of students from the same
population. Subjects were seated in a chair and asked to watch a row of three toy animals placed on the Stimulus Table. They were then turned 180 degrees to the Recall Table and were instructed to arrange the three animals in a row, and to ‘make it the same’. The procedure was repeated five times with each subject.

To induce difference in spatial strategies, the investigators altered the spatial contexts in which the subjects performed the tasks. In one version of the test, 20 students were tested outdoors, and 20 indoors. The outdoor group was tested in an area on the university campus, surrounded by both tall and low buildings. The indoor group was tested in a laboratory room with no features except for a large window. Ten of the subjects were tested with the blinds of the window open, so that they had a view of a building across the street. The other ten performed the test with the blinds closed. Thus, the outdoor group and the blinds-up group had landmark information whereas the blinds-down group had only the laboratory-like setting with no other stimulus than the animals. These different spatial contexts produced different responses according to Li and Gleitman. In the first two the visible landmarks made the subjects aware of the availability of two possible spatial frameworks. They also responded in a way consistent with this. According to Li and Gleitman the subjects in the blinds-down group behaved much as the Dutch subjects in Brown and Levinson, predominantly choosing the relative response. Subjects in the blinds-up and the outdoor groups were divided, producing either all absolute or all relative responses.

Li and Gleitman also noted whether the subjects asked for clarification during or after the test. They found that in the blinds-down condition only 20 percent of the subjects asked for clarification whereas in the other conditions 70 percent asked for clarification. The explanation they suggest for this is that visible landmarks made subjects more aware that two possible spatial strategies were available.

From these results, Li and Gleitman conclude that landmark information has a bearing on the way spatial tasks are solved by the subjects. Although all subjects were mono-lingual English speakers they behaved differently depending on the spatial context in which they solved the tasks. As speakers of a ‘relative’ language they would be expected to solve the problems using the relative frames of reference. This was the case in the featureless blinds-down condition. However, in the landmark-rich settings (blinds-up and outdoors), subjects have the possibility to arrange the animals ‘in the same direction relative to the spatial layout defined by the landmarks surrounding the tabletops or in the same direction relative to one’s own body position facing a tabletop’ (Li and Gleitman 2002: 279). Accordingly, half of the subjects chose the relative solution and half chose the absolute.

In another experiment a landmark cue was placed on the table top. Forty new subjects were tested individually in the laboratory room used for the first experiment. The blinds were open all the time and a little toy (a pair of
kissing ducks) was placed on the right/south side of the Stimulus Table as a potential landmark. An identical toy was placed on the Recall Table. For half the subjects (the Relative Ducks group) the toy was placed on the right side of the Recall Table. For the other half (the Absolute Ducks group), the toy was placed on the south side of the Recall Table. As in the earlier experiments the subjects were handed the animals and asked to ‘make it the same’. According to Li and Gleitman, the results for the Relative Ducks group were exactly like those obtained for the Dutch subjects in Brown and Levinson. The results in the Absolute Ducks group were exactly like the Tenejapan results. This suggests that the placement of a landmark cue on the table top affects the way subjects solve the spatial task in the experiment. Li and Gleitman conclude that both relative and absolute strategies can be reproduced within a single language community. This ‘tends to vitiate the claim that specific language features – say, the spatial-terminological difference between Tzeltal and Dutch – are the underlying cause, or the sole underlying cause, of the original effects’ (Li and Gleitman 2002: 282). Monolingual subjects solved the spatial tasks differently depending on the spatial context. If landmark cues were made available to them they tended to make absolute (allocentric) responses instead of relative (egocentric) ones. So maybe choice of strategy is dependent on environment, not language or ‘human nature’.

Thus, it may not be the nature, even the linguistically learned nature, of an individual to solve this kind of spatial problem in some particular way. Rather, the choice may be a function of the cues made consistently available in the environment. (Li and Gleitman 2002: 282, italics in original)

According to Li and Gleitman, it is possible that such factors influenced the results of Brown and Levinson, as the landmark cues differed for their Dutch and Tenejapan subjects. To add further support to the proposal that availability and salience of landmark cues influence the way spatial tasks are solved in the monolingual English-speaking population, Li and Gleitman refer to studies in which populations of rats are shown to use landmark information if it is made available to them (Li and Gleitman 2002: 283–84). They also refer to studies of infants that suggest that spatial reasoning in human infants seems to be malleable in the same way (Li and Gleitman 2002: 284).

However, there are still two questions that need explanation, Li and Gleitman state. The first is why speakers of different languages tend to use different strategies even in the conditions with few landmarks (Pederson et al. 1998). The second is why communities tend to show a general bias towards allocentric or egocentric spatial usage. From a Whorfian point of view, the answer to both questions would be that speakers are led by spatial categories in their language.
To the first question, Li and Gleitman suggest the following explanation. In the experiment, the subject is told to ‘make it the same’, which is an ambiguous command. This ambiguity, together with the pragmatics of language use, is likely to affect the response.

According to Li and Gleitman, there are several studies (e.g. Imai and Gentner 1997; Soja, Carey, and Spelke 1991) in which speakers of very different languages are shown to be able to sort stimuli into object and substance categories in a similar way, despite linguistic differences. In the same studies, effects of language are often observed when there is some kind of linguistic label involved and when stimuli are difficult to classify. For example, a simple shape of some material, like a kidney-shaped piece of wax called ‘blicket’, is likely to be classified as an object by English speakers, but as substance by Japanese speakers. The suggested explanation for this is that when the subject sees something that is not of a very distinct shape, and hears a name for it, he/she has to make a guess. Since object nouns are so much more common in English than mass nouns, the English-speaker is likely to classify the stimulus as object, that is, to make a pragmatic guess based on the distribution of nouns in English. According to Li and Gleitman, the same reasoning applies to the neo-Whorfian findings. When facing the Recall Table, the subjects are instructed to arrange the toy animals and ‘make it the same’ – an ambiguous command. The subject is left to guess the intent of the investigator. The pragmatics of a language can now serve as a cue: ‘likely if one American is speaking to another about object placement in this small-scale apparatus, it will be in the style of making spatial reference common in the community – left–right, not east–west. For the Tenejapans, of course the opposite likelihood obtains’ (Li and Gleitman 2002: 286). To Li and Gleitman, effects of this kind do not qualify as Whorfian effects.

Such effects of language on language are widespread and well known but they do not imply effects of language on thought in any recognizable sense of linguistic determinism. The subjects have not been forced or guided into a mode of spatial reasoning about space by features of their language. Rather, in a situation that makes either of two available reasoning strategies reasonable, the subject makes a pragmatically sensible guess as to which one the speaker probably had in mind and is talking about. (Li and Gleitman 2002: 286)

In this view, the subjects are not led by the frames of reference available in language. In the choice between possible interpretations of ‘the same’, the subject makes a guess about the intentions of the investigator, based on the fashion of making spatial reference in the community. To Li and Gleitman, this explains the fact that speakers of different languages choose different strategies even in neutral or landmark-poor conditions.

For the second question, why communities have a general bias towards absolute or relative spatial usage, Li and Gleitman offer three potential ex-
planatory factors. The communities that showed absolute bias in the rotation tasks share at least three characteristics: they are less educated, they are more isolated from other groups and geographically cohesive, and, their languages have been classified as absolute. While relativists focus on the third factor as an explanation of the difference in spatial thinking, Li and Gleitman suggest that the first two factors may be of greater importance. In fact they suggest that the reason for the choice of spatial styles may be geographical conditions.

There seems to be no consensual ‘uphill’ that can serve as a reference point in the very large and shifting communities in which linguistically interacting English, Dutch, or Japanese speakers generally find themselves [...] In contrast [...], people who live in a small, mutually familiar, geographical area typically use its local landmarks to devise a spatial coordinate system that makes reference to its stable features (“uphill”, “inland”, etc.) (Li and Gleitman 2002: 289)

The ‘causal engine’, Li and Gleitman argue, both of the spatial reasoning styles and ‘the fashions of speech’ that are found in different communities, ‘may well be a derivative of their ambient spatial circumstances’.

The correlations between cognitive style and linguistic patterning need not be doubted, but instead the direction of causation. By showing that speakers of a single language can be induced to vary their spatial reasoning strategies by supplying or withholding landmark information, Li and Gleitman claim to have undermined the arguments for linguistic relativity. While Pederson et al. (1998: 586) assert that ‘the linguistic system is far more than just an AVAILABLE pattern for creating internal representations; to learn to speak a language successfully REQUIRES speakers to develop an appropriate mental representation which is then available for nonlinguistic purposes’, Li and Gleitman claim instead that:

linguistic systems are *merely* the formal and expressive medium that speakers devise to describe their mental representations and manipulations of their reference world. Depending on the local circumstances in which human beings find themselves, they select accordingly from this linguistically available pool of resources for describing regions and directions in space. (Li and Gleitman 2002: 290)

Thus, Li and Gleitman do not oppose the underlying idea of separate factors correlating with each other. However, they disagree with the causal direction. Language categories do not determine thinking, since language is merely the formal and expressive medium for something that is already there. Cognition comes first because concepts are innate. Depending on local spatial circumstances, humans choose from available resources.
In a response, Levinson et al. (2002) defend the conclusions in e.g. Pederson et al. (1998). They argue that the results of Li and Gleitman are based on the wrong assumptions.

First, it is not true that relative responses were only obtained in landmark free settings, and absolute responses outdoors in landmark rich settings, as argued by Li and Gleitman. On the contrary, a great deal of absolute data was collected in a room without windows.

Second, Li and Gleitman fail in their study to make a crucial distinction between frames of reference. They equate the ‘absolute’ in Pederson et al. with ‘allocentric’, which is a higher-order classification. They base their experiments and the interpretations on the distinction between ‘allocentric’ and ‘egocentric’ frames of reference. But according to Levinson et al., ‘allocentric’ frames of reference include both ‘intrinsic’ and ‘absolute’ frames of reference. In their experiments Li and Gleitman confound intrinsic and absolute frames of reference, and seem to think that the ‘intrinsic’ frame of reference is a kind of ‘absolute’ frame. However, this is not the case. What they believe to be an absolute condition is in fact an intrinsic condition. As a consequence, Li and Gleitman have misinterpreted their own results. Levinson et al. tried to replicate the experiments but found that the ‘absolute responses’ in Li and Gleitman (2002) are in fact ‘intrinsic responses’.

Third, Li and Gleitman chose the simplest of all tests and made it even simpler. This made the task too transparent to the subjects. Instead of provoking a non-reflective response to a spatial task, it made the subjects aware of the possible solutions, which made them try to guess the intentions of the investigator. Thus, Li and Gleitman are not really measuring non-linguistic spatial thinking in the way that Levinson et al. claim they do. Instead, the subjects are trying to guess which one of two possible solutions the experimenter has in mind. According to Levinson et al. this explains the results of the Outdoor condition in which the responses were either all relative or all absolute.

According to Levinson et al. then, Li and Gleitman have only shown that it is possible to induce ‘intrinsic’ or ‘relative’ behaviour and, since both these frames of reference are used in English, this is not a surprising finding.

Further evidence against the impact of language on cognition is offered by Munnich and Landau (2003). They discriminate between two kinds of possible effects of language on thought. The first is an effect of learning a language on the organization of linguistic representations. The second is an effect of learning a language on the organization of non-linguistic representations. They argue that although there is substantial evidence in favour of the view that linguistic experience causes changes in linguistic organization, there is also evidence that linguistic experience does not cause changes in non-linguistic organization.
As evidence of an effect of the first kind, Munnich and Landau refer to studies in spatial semantics (e.g. Bowerman 1996), in which the English IN/ON distinction is compared to the Korean distinction based on ‘tightness of fit’ that crosses the distinction between IN and ON (see Chapter 3 for more details). As these studies show, there is great diversity in spatial semantics. For example, Spanish also lacks a distinction corresponding to the English distinction between IN and ON. Instead, a single preposition EN is sufficient to express the equivalents of ‘an apple IN a bowl’ and ‘a cup ON the table’. In these studies, Bowerman and Choi examined young children’s production of spatial terms in order to answer the question whether non-linguistic universal concepts guide spatial language acquisition. The assumption was that if non-linguistic universals guide the acquisition of spatial language, then this would be evident in early production. Children would express the same meanings regardless of the language they learn. Bowerman and Choi found that children’s early production differed and strongly reflected the distinctions in their own language. According to Munnich and Landau (2003: 121), this suggests that children acquire the semantic categories of their language very early. The categories do not map ‘transiently onto categories derivable from perceptual or motor experience’. They depend at least in part on linguistic experience. However, although the learning of spatial semantic categories seem to be early in life and dependent on linguistic experience, the results do not tell us ‘whether these newly learned lexical categories were constructed from nonlinguistic spatial categories (cognitive, perceptual, or sensorimotor)’, or ‘whether the acquisition of the former categories somehow changes the organization of the latter’ (Munnich and Landau 2003: 122). Because Bowerman and Choi do not compare linguistic production with performance of non-linguistic tasks, their findings do not address the question of whether the acquisition of spatial language changes spatial thought, that is, the second kind of effect. To further investigate the second kind of effect, Munnich and Landau refer to studies on Tzeltal speakers in Tenejapa by Brown and Levinson. In addition to joining in the criticism delivered by Li and Gleitman (2002), who suggest that spatial behaviour can easily be altered by adding or withholding landmark information, Munnich and Landau question the findings in another way. It is possible, they argue, that the tasks developed by Brown and Levinson are solved by using language. The subjects are asked to look at an array of objects on a table. They are then rotated 180 degrees to face another table to remake the array. According to Munnich and Landau, if this takes several seconds, there would be time for the subjects to verbally encode and rehearse the objects locations. If the locations are verbally encoded before the recall task is performed, then the task is linguistically mediated. In that case, Munnich and Landau argue, the results cannot be used to argue for or against an effect of language on non-linguistic cognition. So they conclude that Brown and Lev-
in son do not in fact have evidence that linguistic experience shapes non-linguistic spatial cognition.

Further evidence against the claim that language shapes non-linguistic cognition is offered in Munnich et al. (2001) and Munnich and Landau (2003). Munnich et al. (2001) examined spatial language and spatial memory cross-linguistically. For example, speakers of English and speakers of Korean were compared when performing linguistic tasks and memory tasks. In English there is a distinction between ON and ABOVE which has no equivalent in Korean. The Korean lexicon ‘does not distinguish obligatorily between relationships of contact and noncontact along the reference object’s axial extensions’ (Munnich and Landau 2003: 131). Therefore, a ball ON a table and a ball ABOVE a table are expressed differently in English but not in Korean. To examine whether the linguistic patterns correspond to memory patterns, speakers of English and speakers of Korean performed naming tasks and memory tasks in which the ON/ABOVE distinction was involved. In the naming tasks, the subjects were asked to view stimulus scenes that displayed a cup or a basketball as figure object and a table as the reference object. In some scenes the balls and cups were resting on the table, in other scenes they were hovering above it. The subjects were then asked to describe the relation between the cup/basketball and the table by filling in the missing part of a sentence: ‘The cup is ______ the table’ (Munnich et al. 2001: 193). The English speakers consistently used the above/on distinction in their descriptions of the scenes. Only half of the Korean speakers ever mentioned contact in their descriptions of scenes were the ball/cup was in contact with the table. In the memory tasks the subjects were shown two scenes and were then asked to judge whether the second scene displayed the same spatial relationship as the first. The results of the memory tasks showed that the contact/noncontact distinction was equally important to both groups. There was no difference in ‘memorial accuracy’ between the two groups, which suggests that ‘whether the linguistic distinction is made or not made on a regular basis over a lifetime of use, the structure of memory remains the same. […] The representation of location in memory is not affected by differences in the contrasts made by different languages, even if they are engaged over an entire lifetime’ (Munnich and Landau 2003: 132).

Thus, Munnich and Landau admit that language has an effect on the level of linguistic representation.

Learning a native language results in significant reorganization of the speaker’s phonological, syntactic, and semantic representations. These effects are deep, permanent, and hard to undo later in development. They clearly demonstrate that one system of knowledge – linguistic representation – is modulated by the experience of learning one’s native language. (Munnich and Landau 2003: 115–16).
However, they do not agree on the suggestion that learning a language affects non-linguistic thinking. The structure of memory, they claim, remains the same despite semantic differences between languages.

Goldin-Meadow (e.g. 2003 and 2007) addresses the Whorfian question arguing that linguistic input is not needed to develop language. In studies of deaf children she has found that despite hearing losses these children invent gesture systems, referred to as homesigns, which in many ways resemble ‘natural language’. Among the properties that deaf children harnessed for their gesture systems are segmentation and combination, properties which are absent in the gestures that hearing speakers produce when they talk. According to Goldin-Meadow, the findings among deaf children challenge the usage-based approaches to language learning, advocated by e.g. Bowerman and Choi, (2001 and 2003). As she explains:

A strict usage-based account would predict that, in the absence of linguistic input, a child would not communicate in language-like ways. After all, there would be no input from which to glean linguistic patterns. But this prediction fails. Deaf children whose hearing losses prevent them from acquiring the spoken language of their community, and whose hearing parents have not exposed them to a conventional sign language, lack usable linguistic input. Nevertheless, these children invent gesture systems, called homesigns, that display many of the properties found in natural language. (Goldin-Meadow 2007: 417–18)

Children thus have biases to ‘structure their communication in language-like ways, biases that reflect their cognitive skills’ (Goldin-Meadow 2007: 417). According to Goldin-Meadow, what determines these biases is still not clear, but it is clearly not linguistic input.

The criticism reviewed above concerns the question whether cognition is shaped by language on any level, or whether it is independent of language. Goldin-Meadow questions the role of language input on the grounds that it is possible to invent languages without linguistic input, and suggests that language learning may be innate. Li and Gleitman (2002) and Munnich and Landau (2003) all deny the effects of language on non-linguistic cognition. The results of studies by Brown and Levinson and Pederson et al. are rejected, either on the ground that the tasks are linguistically mediated and thus do not measure non-linguistic cognition, or that the responses are in fact results of landmark information rather than language.

In the following section, an argument for the role of culture in shaping language is presented.

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15 A usage-based approach to language emphasizes linguistic input, and the critical role of factors like type and token frequency, and the learners’ ability to induce categories and schemas and to restructure them in response to e.g. changes in input.
4.2 Grammar is shaped by culture

Everett (2005) focuses on a number of unusual features in the Pirahã language which, he argues, are evidence against several of the universal design features of human language proposed by Hockett (1960), and the Chomskyan view of grammar. Everett’s conclusions are based on experience from the Pirahã language and culture in Brazil. Although he welcomes the recent investigations of the linguistic relativity hypothesis (e.g. Lucy 1992a and b; Gentner and Goldin-Meadow 2003a), he argues that there has not been sufficient work on the constraints that culture can place on grammatical structures. According to Everett there are several aspects of the culture and language of Pirahã that suggest that Pirahã culture severely constrains Pirahã grammar, producing ‘gaps’ in the Pirahã morphosyntax. He also suggests that the same cultural constraint may have an effect on cognition too. Everett (2005: 623–33), reports on a number of unusual properties of Pirahã, e.g. lack of grammatical number, lack of terms for quantification, lack of a concept of counting, lack of colour terms, lack of embedding (putting a grammatical constituent inside another of the same type, e.g., a clause inside a clause), a very simple pronoun inventory, lack of perfect tense, and a very simple kinship system. These properties all follow from a cultural constraint, Everett suggests, namely ‘the restriction of communication to the immediate experience of the interlocutors’, that is, the Pirahã people do not discuss things outside of immediate experience.

One of the more rare features, according to Everett, is the lack of number and counting. In the Pirahã language there is no grammatical number or numerals, and therefore no number contrasts on nouns, pronouns or verbs. There are no terms for quantification such as ‘all’, ‘every’, ‘most’ or ‘some’. Moreover, there is no concept of counting, and the Pirahã people cannot count. They also seem to be unwilling to learn to count, Everett says. At a time when he was living with his family in a Pirahã village, Everett started daily classes in literacy and counting. This was done at the request of the Pirahã men and women. Each evening for eight months, Everett and his wife tried to teach the Pirahã to count to ten in Portuguese. After all these months of daily classes, the people concluded that they could not learn the material. Not a single one of them learned to count to ten, or to add even 1+1.

When trading in Portuguese with the owners of riverboats that regularly come to the villages to trade, the Pirahã do not seem to have a sense of exact quantity, Everett says. One might ask for a large roll of tobacco in exchange for a small sack of nuts, or a small amount of tobacco for a large sack. In this

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16 Pirahã is a member of the Mura language family. It is spoken in several villages along the Maici River in the state of Amazonas, Brazil (Everett 1986).
trading, there is ‘no evidence whatsoever of quantification or counting or learning of the basis of trade values’ (Everett 2005: 626).

The absence of counting, Everett argues, need not follow from linguistic patterns (linguistic relativity). Rather, it seems that the lack of counting, together with other ‘absences’ in the Pirahã culture, results from the higher-level cultural constraint mentioned above. Number terms are used to quantify beyond immediate, spatio-temporally bound experience, and this is something the Pirahã do not engage in.

According to Everett, there are no colour terms in Pirahã, at least not morphologically simple colour words (but see, e.g., Kay 2005 for a discussion). When asked about different colours on different occasions the Pirahã have been able to distinguish between colours, and Everett therefore concludes that there is no corresponding lack of ability as is the case with counting. However, the Pirahã do not talk about colours, or e.g. ‘red things’ as an abstract category. They only talk about colours as describing specific objects in their own experience.

Other features of Pirahã are the absence of creation myths and fiction, and a very simple kinship system. The Pirahã’s kinship system may be the simplest yet recorded, according to Everett. The kinship terms refer only to known relatives, never to relatives who died before one was born. When working on a genealogy for an entire village, Everett was not able to find anyone who could give the names of his/her great-grandparents. Only a few could remember the names of all four grandparents. Kinship terms refer only to known relatives, never more than two generations back. This, Everett states, conforms to the principle of immediacy of experience.

The properties of Pirahã, Everett argues, serve as evidence for the influence of culture on grammar. While some (e.g. Gordon 2004) would conclude that the lack of counting among the Pirahã follows from the lack of number words, Everett argues that lack of grammatical number and the other ‘gaps’ in Pirahã derive from a single cultural constraint in Pirahã, namely ‘the restriction of communication to the immediate experience of the interlocutors’. Pirahã culture avoids ‘talking about knowledge that ranges beyond personal, usually immediate experience or is transmitted via such experience’ (Everett 2005: 623). The constraint must be cultural, Everett argues, because, ‘while there does not seem to be any linguistic or cognitive commonality between the items, there is a cultural value that they share, namely, the value of referring only to immediate experience’ (Everett 2005: 626). Everett suggests that the inability to count may be a long-term cognitive effect of the cultural constraint too.

Thus, Everett argues against the idea that human languages share universal design features. In contrast to the statement (Newmeyer 2002: 361 quoted in Everett 2005), that ‘there is no hope of correlating a language’s gross grammatical properties with sociocultural facts about its speakers’ he proposes that grammatical properties are not only correlated with, but may
be determined by sociocultural facts. This is also an argument against the ‘unidirectionality inherent in linguistic relativity’ which he claims offers ‘an insufficient tool for language-cognition connections more generally in that it fails to recognize the fundamental role of culture in shaping language’ (Everett 2005: 623).

The results have some implications for the enterprise of linguistics, Everett argues. If culture is ‘causally implicated in grammatical forms, then one must learn one’s culture to learn one’s grammar’, which makes the Chomskyan view of grammar untenable. Linguistic fieldwork should be carried out in a cultural community of speakers, ‘because only by studying the culture and the grammar together can the linguist (or ethnologist) understand either’. Further, studies that ‘merely look for constructions to interact with a particular thesis by looking in an unsophisticated way at data from a variety of grammars are fundamentally untrustworthy because they are too far removed from the original situation. Grammars, especially those of little-studied languages, need an understanding of the cultural matrix from which they emerged to be properly evaluated or used in theoretical research’ (Everett 2005: 633).

Everett’s article has raised some criticism, partly concerning the uniqueness of the ‘gaps’ in the Pirahã language (e.g. Berlin 2005) and the accuracy of his observations (e.g. Kay 2005). Similar features have been documented in other languages, it is argued. Levinson (2005: 638) rejects Everett’s claim to have undermined the neo-Whorfian arguments. He questions the proposal that culture influences languages on the ground that ‘no one interested in language diversity would make a simple dichotomy between language and culture’. A language is a crucial part of a culture ‘and is adapted to the rest of it’. The question that neo-Whorfians are interested in according to Levinson, is ‘how culture gets into the head’, and language appears to play a crucial role in this. It is learned earlier than ‘most aspects of culture’, it is ‘the most highly practiced set of cultural skills’, and it is ‘a representation system that is at once public and private, cultural and mental’. According to Levinson, it is hard to explain ‘non-ecologically induced uniformities in cognitive style without invoking language as a causal factor’.

In a response to Everett, Tomasello (2005) agrees with the general proposition that only the things that people talk about will get grammaticalized. It seems logical, he argues, that what the Pirahã people do not talk about, does not come into their language. The alternative to this view would be universal grammar.

Wierzbicka (2005) agrees with the claim that culture shapes language to a degree, but at the same time she argues for a set of universal semantic primes, ‘out of which all other, culture-dependent, meanings can be constructed’. Languages may differ in their semantic systems, she says, but all evidence points to ‘the psychic unity of mankind’. In recent work on seman-
tics, there is evidence of at least 65 universal semantic primes ‘lying at the heart of all languages’.

As we can see from Everett (2005), it is possible to claim correlation between language and thinking/culture without embracing the hypothesis of linguistic relativity. Everett describes the Pirahã language in much the same way as proponents of linguistic relativity describe Tenejapan, Japanese, Dutch or any other language discussed in the relativity literature. He also finds correlations with certain behaviours, such as a lack of counting. And yet his conclusions about the correlation between grammar and culture/cognition are different. How can this be? Correlation is not the same as causation, and sometimes there is no way of knowing what is cause and what is effect. One simply tries to find the most plausible explanation by way of reasoning and analysing the relevant facts. Levinson (2003) argues that the correlation between categories of a language and the speakers’ response in rotation tasks (e.g. Animals in a row) is best explained as a causal relation from language to thought, otherwise there is no explanation of the fact that members of a speech community share the same cognitive style (see Chapter 3 for more details). Everett, on the other hand, argues that the constraint must be cultural, because there is no linguistic or cognitive commonality between the ‘gaps’ in Pirahã. However, they do share a cultural value, ‘namely, the value of referring only to immediate experience’. This cultural constraint may even have long-term effects on cognition, he argues. That is, the lack of counting may be seen as an effect of culture on cognition.

Although Everett and Levinson disagree on the direction of causal influence, they share the view of language and thought/culture as separate variables that stand in correlation to each other.

The next section treats a different approach to linguistic relativity. Greiffenhagen and Sharrock (2007) do not offer evidence for or against relativity claims. Instead, they question some assumptions about language upon which the relativity hypothesis is based. Although the object of their criticism is a form of linguistic relativity that differs from the one criticized in the present thesis, they show how the issue may be approached from another angle. Therefore the critique they offer is relevant to the present study.

4.3 Questioning the assumptions behind the relativity hypothesis

Greiffenhagen and Sharrock (2007) argue that linguistic relativity is based on two assumptions, namely, that the purpose of language is description and that being able to speak a language presupposes an ontological theory about
the constituents of the world. They do not question grammatical or lexical diversity between languages, but they argue that linguistic relativity is not an empirical but a philosophical project.

The project of linguistic relativism only works by making several (unwarranted) assumptions about language. Firstly, it assumes that the (only) function or purpose of language is description. In other words, it assumes that language is a tool for naming the things in the world. This assumption has an important corollary: if the purpose of every language is description, then it is possible to compare whole languages of different cultures (as they share the same ‘purpose’ of naming things in the world).

Secondly, in a typical intellectualist manner, linguistic relativism stipulates that all description presupposes an ontological theory or a metaphysics [...] In the form that we encounter it here this results in the primitive idea that the relationship between language and reality is effected by naming, and that the metaphysics of a language is manifested in the kinds of things that its names stand for. (Greiffenhagen and Sharrock 2007: 83)

In their own view, language is ‘inevitably tied to a people’s culture, i.e., to the world that people live in and the practices that they engage in’ (Greiffenhagen and Sharrock 2007: 83). Thereby it is not possible to compare whole languages, only aspects of languages.

As an example of linguistic relativity, Greiffenhagen and Sharrock focus on a case of ‘linguistic-cum-mathematical relativism’ (e.g. Watson 1990). Watson looks at natural number in two different languages: English and the Yoruba language of West Africa. It follows from Watson (1990) that the Yoruba language has a different numeral system than the English numeral system. Watson focuses on the practice of referring in language. Learning a language, she claims, involves learning to classify types of objects, and types of relations between objects. Learning to classify the relations or actions between bodies results in children ‘accumulating lexical items which in time will come to function as predicators (verbs) in making meaningful sentences’, and learning to use verbs (to predicate) ‘is an accomplishment of great importance for every language learner, for along with predicating comes referring or designating’ (Watson 1990: 286–87).

Although learning a language starts with classification, this does not in itself amount to making meaningful sentences, Watson argues. Meaningful sentences require a particular theory of the world which one acquires through adopting a particular way of classifying.

A theory of the world has necessarily been engaged through adopting a particular way of classifying over actions of bodies in coming to use verbs, and the sorts of things that constitute the world are inevitably postulated. A specific sort of referring or designating category has been adopted. This particular type of referring category becomes an obligatory assumption of all those who use the language. It is a postulate about the type of the constituents of the material world. (Watson 1990: 287)
Watson suggests that ‘the types of things that English-speakers postulate as constituents of the world differ from the types of things that Yoruba-speakers postulate as constituting the world – that is, that the types of designating categories used in the two languages differ’ (Watson 1990: 288). In using referring or designating categories ‘we are accepting postulates about the types of material objects that there are in the world’ (p. 288).

In everyday quantification, speakers of English talk either of collections of individual things or of cumulations of continuous matter, because ‘their language has them referring to spatiotemporal particulars’ (Watson 1990: 294). In counting, ‘individual things (units of the quality of numerosity) and integers of number are taken to be analogous’. The Yoruba number system is ‘a multi-base numeral sequence which makes constant back and forward reference to multiples of the bases’ (p. 303). The most important base is twenty. Five and ten are points at which the twenties are broken up, so the system may be called secondarily quinary and decimal. Watson argues that while the English number system is the consequence of talking of spatiotemporal particulars, the Yoruba system is a consequence of talking of sortal particulars. The two number systems are ‘constructs created in two disparate systems of categorization’ (Watson 1990: 306). By using the different systems, the speakers are adopting a theory about the type of the constituents of the material world. And in that way, language has an influence over thinking (see Watson 1990 for details).

Greiffenhagen and Sharrock (2007) oppose Watson’s view of an underlying theory about the constituents of the world. They also question the description of language as a referring practice. While Watson sees language as allowing people to talk about the world, Greiffenhagen and Sharrock argue that ordinary people rarely talk ‘about’ the world.

The affairs of people acting within practices would be better characterised as talking ‘in’ the world. It is an intellectualist fallacy to suppose that language was ‘invented’ in order to talk about the world – rather than as part of various cultural practices. (Greiffenhagen and Sharrock 2007: 87)

They argue that Watson seems to be an example of Quine’s (1960) ‘ideal linguist’ in a foreign country. This linguist adopts an objective perspective on the unknown culture and is then faced with the problem of inferring from natives’ verbal behaviour what the meanings of their sounds are.17 There is no mentioning of what people actually do, just the way they talk about the world. According to Greiffenhagen and Sharrock, a picture of language in

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17 In a well-known discussion about ‘indeterminacy of translation’ and ‘radical translation’, (Quine 1960: 28) presents the following thought experiment: A linguist is staying in a foreign country with a language he does not know. When a rabbit runs by his native informants utter the word ‘Gavagai’. The linguist finds that ‘rabbit’ is a possible translation, but how is he to know if it means ‘rabbit’, ‘rabbit-stage’, ‘undetached rabbit parts’ etc.?
which meaning is understood as a matter of associating words with the things they stand for, suggests that there is a level of thoughts (or meanings) that are prior to language. And language is a way of expressing, or communicating these thoughts.

In contrast, Greiffenhagen and Sharrock argue that concepts are acquired from language and that thoughts and language co-evolve. Further, language is tied to a culture’s activities. Language ‘co-evolves with activities and it is only in those activities that language-use possesses its sense’. Language is not a way to talk ‘about’ the world, but to carry out activities. The purpose of language is thus not to describe the world; it is tied to other cultural activities. Naming things is not the purpose of language, Greiffenhagen and Sharrock state (referring to Wittgenstein 1953), but only a preparation. ‘Naming is so far not a move in the language-game – any more than putting a piece in its place on the board is a move in chess. We may say: nothing has so far been done, when a thing has been named’ (Wittgenstein 1953, Section 49).

By stipulating that the purpose of language is description, ‘the relativist is enabled to compare languages wholesale’. If language is seen as dependent on culture however, it is more difficult to compare languages ‘without reference to one or other of the “language games” that are played – and the differences that do exist may turn out to require complex, not sweeping, comparisons’ (Greiffenhagen and Sharrock 2007: 88).

Thus Greiffenhagen and Sharrock approach the relativity issue in a different way in that they do not deny linguistic diversity, but question the assumptions about language that are necessary to maintain the relativity hypothesis. In Chapter 5 I will further discuss the role of underlying assumptions about language for the relativity hypothesis.

Two other authors who question underlying assumptions about language in the relativity literature are Hill and Mannheim. In an early critique of the neo-Whorfian research, Hill and Mannheim (1992) problematize the view of language, thought, and culture as three discrete variables (see also Lee 1994 and 1996). They question the view that language and non-language can be separated and then related to each other.

There is no prima facie way to identify certain behaviors – or better, certain forms of social action – as linguistic and others as cultural […]

Thus ‘language’ and ‘culture’ cannot be neatly separated by distinctions like ‘structure’ versus ‘practice.’ Further, ‘meaning’ can only be known in another language through social action and speech, and the relevant units for analyzing these in another culture can only be worked out through their language. (Hill and Mannheim 1992: 382)

Hill and Mannheim further question the way ‘linguistic relativity’ has come to be treated as a ‘hypothesis’. They maintain that linguistic relativity as proposed by Boas, Sapir and Whorf ‘is not a hypothesis in the traditional
sense, but an axiom, a part of the initial epistemology and methodology of the linguistic anthropologist’ (Hill and Mannheim 1992: 383). Neither Boas nor Sapir or Whorf advocated the extreme relativism for which they have subsequently been criticized. According to Hill and Mannheim they assumed a more limited position, ‘recognizing that linguistic and cultural particulars intersect with universals’, and they all recognized that ‘kinds of cognitive organization quite general to human beings might underlie the capacity for language’ (Hill and Mannheim 1992: 383).

According to Hill and Mannheim, Boas, Sapir and Whorf all limited their claims about the power of language over thought to specific, highly habituated forms. Boas described the selective power of obligatory categories of grammar and Sapir focused on unreflective idiomatic expressions. Whorf focused on habitual fashions of speaking, and nowhere did he speak of ‘dependent’ or ‘independent’ ‘variables’.

Since none of them thought of language, culture and thought as separate variables, ‘the “Sapir-Whorf Hypothesis” is neither consistent with the writings of Sapir and Whorf, nor a hypothesis’ (Hill and Mannheim 1992: 386). Instead, it is an axiom, and, ‘as with other working assumptions […] it can only be judged on the basis of the extent to which it leads to productive questions about talk and social action, not by canons of falsifiability’. The rhetoric of ‘hypotheses’ and ‘variables’ ‘makes sense only within a view of language as a map of nonlinguistic reality’ (Hill and Mannheim 1992: 386).

By the 1950s, a body of scholarly folklore grew around Sapir and Whorf ‘that hardened “linguistic relativity” into the familiar formula that treats language, thought, and meaning as three discrete, identifiable, and orthogonal phenomena’ (Hill and Mannheim 1992: 385). This formula rests, according to Hill and Mannheim, on the category error that identifies language, thought and culture with linguistics, psychology and anthropology respectively. From this position, Hill and Mannheim criticize the neo-Whorfian studies of the early 1990s (e.g. Lucy 1992b). The modern debate on linguistic relativity, they claim, has ‘consistently confused assumptions with research findings, axiom with hypothesis’ (Hill and Mannheim 1992: 387).

Despite their critique of how other scholars have treated the relativity issue, Hill and Mannheim maintain that there are Whorfian effects. They argue that a narrower interpretation of the Boasian tradition could hold that grammatical categories, if they are habitual or obligatory and relatively inaccessible to the speaker’s consciousness, ‘will form a privileged location for transmitting and reproducing cultural and social categories’. Grammatical categories will play a key role ‘in structuring cognitive categories and social fields by constraining the ontology that is taken for granted by speakers’ (Hill and Mannheim 1992: 387). This narrow interpretation would also fit in with a theory of ‘structuration’ in which structure is both an emergent property and constitutive of social interaction.
Grammatical categories would structure the cognitive and social fields at the same time as they are themselves the sedimented outcome of long histories of interaction. (Hill and Mannheim 1992: 387)

According to Hill and Mannheim, the structure of gender in third-person English pronouns provides one example of a Whorfian effect. A central property of the English personal pronoun system is that *he* can be used in an indefinite sense, when the sex of the referent is unknown or irrelevant, or in a generic inclusive way. Since each pronoun ‘indexes a category that is associated with a cognitive prototype or paradigmatic instance’, the paradigmatic instance of *he* is male. According to Hill and Mannheim, both generic and indefinite uses of *he* evoke a male prototype and will be interpreted as male. Such associations are made habitually, on an unconscious level. This is an example of a Whorfian effect.

Here is a straightforward Whorfian effect, in which the structure of a system of grammatical categories affects the social ontology posited by the speakers […]

The example shows how a system of obligatory grammatical categories has cultural implications. The system naturalizes and reproduces categories of social action. (Hill and Mannheim 1992: 389)

The category system of personal pronouns continues to function in everyday contexts, and creates ‘a particular cultural hegemony, the unquestioned acceptance, by both men and women, of men as a normative, unmarked category of person’ (Hill and Mannheim 1992: 389).

Considering their critique of neo-Whorfian studies, what view of language forms the basis for their own personal pronoun example? Language, thought and culture should not be viewed as separate variables, they argue, but is it possible to speak of effects of language on cognition without separating them? In a response to Hill and Mannheim, Lucy (1997: 295) defends the view of language and thought as separate variables, arguing that ‘if there is any interesting claim here, it is about discoverable relations between distinguishable phenomena’. This is implicitly acknowledged by Hill and Mannheim, according to Lucy, when they formulate their own model for relativity (Hill and Mannheim 1992: 387).

Somehow, Hill and Mannheim do separate language and non-language, even if they criticize the distinction. Grammar is the ‘sedimented outcome of long histories of interaction’, and even if grammar is intertwined with ‘cognitive and social fields’, the grammar seems to be prior to language use. The English pronouns constitute a system in which linguistic meaning is fixed. By discussing linguistic forms and their meaning outside of their contexts, a distinction between language and non-language is still maintained.
As shown in the present chapter, the claims of linguistic relativity have been criticized from different angles. In part this follows from the fact that the relation between language and thought possesses many levels, and those who engage in the debate are not always talking about the same things. From the arguments for and against linguistic relativity the following questions may be discerned as important to the debate.

First, there is the question whether concepts, e.g. spatial concepts, are universal and hence independent of (spatial) language. According to Li and Gleitman (2002), there is ‘a preexisting conceptual space, programmed into our biological nature’. Words are invented by human beings to label those concepts, and the grammars and lexicons of all languages are broadly similar. Li and Gleitman investigate the possible influence of a language on thinking by making experiments, similar to those reported in e.g. Pederson et al. (1998), but in which the language factor was held constant. They claim that there is no evidence to support the view that categories of language influence spatial concepts. Instead, they suggest that landmark information may induce different responses. Depending on the local circumstances, people chose which spatial frame of reference to use from an innate repertoire of frames.

Second, there is the question whether there may be an effect of language on ‘linguistic thinking’ as opposed to ‘non-linguistic thinking’. Munnich and Landau (2003) argue in favour of such an effect on the organization of linguistic representations and against an effect on non-linguistic representations. Levinson and Lucy & Gaskins claim to have evidence for an effect on non-linguistic thinking. Both views presuppose a notion of language and non-language as separate. Hill and Mannheim (1992) point to the difficulty of separating language from culture, and language from thinking, but they do not exclude Whorfian effects of unconscious grammatical patterns.

Third, there is the question – assuming that language and thought are correlated, and hence not independent – of whether the conclusion that there is causality from language to thought is correct. Everett (2005) argues that the unidirectionality in linguistic relativity offers an insufficient tool for language-cognition connections. He claims to have evidence for the role of culture in shaping grammar, and possibly also cognition.

Fourth, there is the question of which variables that are involved in the relativity hypothesis. In the neo-Whorfian studies it is usually asserted that language influences thought. But in the discussions for
and against the hypothesis, *culture* is often invoked as a possible explanatory factor. While the relevant aspects of language and thinking are usually defined in each study (e.g. material/shape distinctions or frames of reference), culture is rarely defined in the same way (except in Everett 2005). Both Levinson (2005) and Everett (2005) claim that they do not make a distinction between culture and language, but in their discussions they actually do so. Everett argues against linguistic relativity on the grounds that he has found evidence that culture shapes grammar, and in the long run, possibly also cognition. In other words, the reason that the Pirahã do not count, is not that they lack words for counting, but rather that their culture prevents them from talking about things outside immediate experience, such as abstract numbers. Levinson on the other hand, argues that language affects cognition. Culture is mostly discussed in terms of literacy, lifestyle etc., and discarded as a possible influence on cognition. However, in Levinson (2005: 638) it is stated that ‘a language of course is a crucial part of a culture and is adapted to the rest of it’. The question that neo-Whorfians are interested in ‘is how culture gets into the head’ (p. 638). Does Levinson mean that language is not the source of thought difference, but merely the medium needed to get culture into the head? That would be a bit similar to Everett’s claims that cultural constraints shape both language and cognition, except that Everett does not see language use as the mechanism for an influence of culture on cognition. In his view, cultural constraints have cognitive effects, but not through language use.

Fifth, even if we take into account the three variables, *thought, language* and *culture*, how can we distinguish between them? Li and Gleitman (2002) point out that there are several possible interpretations of the established correlations between linguistic practice and modes of thought. Perhaps it is the ‘habitual linguistic practice in these communities that determines the relevant modes of thought’. On the other hand, it could be that ‘cultural differences in modes of thought render certain linguistic usages handier than others, and thus influence their prominence and frequency of use’. Perhaps ‘both such mechanisms are at work’ (Li and Gleitman 2002: 268). In this quotation, are we to understand ‘linguistic practice in a community’ as language or culture? Are ‘cultural differences in modes of thought’ culture or cognition?

Sixth, as is demonstrated by Greiffenhagen and Sharrock (2007), the linguistic relativity hypothesis may be discussed on another level. Their criticism concerns a form of relativity claims that differs from the neo-Whorfian studies that are investigated in the present thesis.
Watson’s study (1990) is not a cross-linguistic empirical investigation of a causal relationship between language and thought, like the work of Levinson, Brown, Bowerman and Choi, or Lucy and Gaskins. But it is relevant to the present thesis because it demonstrates how relativity claims can be questioned in a way that is not usually done. According to Greiffenhagen and Sharrock, linguistic relativity ‘is not an empirical but a philosophical project’. Without denying linguistic or cognitive diversity, they question the relativity hypothesis on the grounds that it is based on false assumptions. Although I agree with Greiffenhagen and Sharrock in their critique of Watson, my focus is on another version of the relativity hypothesis, and therefore my arguments against relativity are slightly different. The neo-Whorfian case studies reviewed in Chapter 3 are not about the metaphysics encoded in each language. It is a claim of a causal relation between features of particular languages (rather than whole languages) and empirically measurable behaviour. Therefore, the critique offered in the present thesis focuses on the operationalization of thought, language, and culture as separate variables in the neo-Whorfian empirical project. In the following chapter I shall continue the discussion and further develop objections to the linguistic relativity hypothesis.
5 Basic assumptions about language, thought and culture in the case studies and the debate

As pointed out in the previous chapter, the arguments for and against linguistic relativity involve a number of questions concerning universality vs. relativity, whether there is a causal relation between language and thought, the direction of causality, and the view of language, thought and culture as separate variables. In the present chapter I shall discuss these further, not in order to answer them, but from the point of view that the questions themselves could not arise independent of the view of language and language use that dominates the linguistic relativity discussion. The proponents of linguistic relativity start with a language (or several) and examine the meanings of linguistic forms and structures. If a specific kind of thinking is needed in order to use the linguistic forms properly, it is argued that the speakers are forced by their language to develop this kind of thinking. Such an argument could not be made unless the languages (or parts of them) that one examines are defined as particular languages, delimited systems in which meaning is established prior to language use. The urge to ‘explain’ behavioural diversity in terms of a cause-and-effect relation between ‘variables’, deflects attention away from language in a broad and general sense, as an integrated practice, in which meaning is not fixed in advance but constantly negotiated in ongoing communication. Language, from this point of view, includes aspects of culture and cognition rather than causing them. The distinction between ‘language’ and ‘particular languages’ and the way these two notions are sometimes confounded in the relativity literature will be addressed in the next section of the current chapter. Further, the distinction has implications both for the notion of linguistic meaning and the distinction between language and non-language, as well as for language learning. Although they overlap, these issues will be addressed separately in sections 5.2 and 5.3. The overriding question, whether human beings in different communities develop concepts and skills that are not shared by members of other communities because they speak different languages, will be addressed in Section 5.4, where the discussions are summarized.
5.1 Language versus languages

The neo-Whorfian hypothesis that is investigated in the present thesis claims that there is a causal relation between language and thinking. Naturally it is important, in a discussion of ‘language’ and what role ‘language’ might play for thinking, to clearly define ‘language’ so as to explain in what sense it has an influence on thinking. Therefore, in the present chapter, the variables involved in this causal relation will be examined, in particular the language variable. The way the term ‘language’ is used in the neo-Whorfian literature is exemplified below.

Lucy (1997) states that the linguistic relativity proposal ‘forms part of the general question of how language influences thought’. According to Lucy, influence may be divided into three levels.\(^{18}\)

The first, or semiotic, level concerns how speaking any natural language at all may influence thinking. The question is whether having a code with a symbolic component (versus one confined to iconic-indexical elements) transforms thinking. If so, we can speak of a semiotic relativity of thought with respect to other species lacking such a code. The second, or structural, level concerns how speaking one or more particular natural languages (e.g. Hopi versus English) may influence thinking. The question is whether quite different morphosyntactic configurations of meaning affect thinking about reality. If so, we can speak of a structural relativity of thought with respect to speakers using a different language […] The third, or functional, level concerns whether using language in a particular way (e.g. schooled) may influence thinking. The question is whether discursive practices affect thinking either by modulating structural influences or by directly influencing the interpretation of the interactional context. If so, we can speak of a functional relativity of thought with respect to speakers using language differently. (Lucy 1997: 292)

Bowerman and Choi (2003) pose the question:

Does language influence nonlinguistic cognition, and do different languages influence it in different ways? (Bowerman and Choi 2003: 387)

Levinson (2003) points to the importance of cross-linguistic comparison in research about language and thought.

Many disciplines and strands of research have a stake in general solutions to the study of the language/cognition interface, for example students of language acquisition and conceptual development, those studying language functioning under brain damage, those interested in the mechanisms of lan-

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\(^{18}\) The second level is the one usually associated with the linguistic relativity hypothesis, and is also the one that Lucy examines.
guage production, not to mention those concerned with the traditional conundrums of ‘language and thought’. (Levinson 2003: 210)

These quotations show that the term ‘language’ is used in what seem to be different senses. Although the research question for the empirical investigations is whether the grammar or lexicon of ‘a language’ (e.g. English, Tene-japan or Yucatec Maya) has an effect on thinking (e.g. classificatory preference or spatial computation), the empirical investigations of ‘particular languages’ are meant to give information about the relation between thought and ‘language’ in some more general sense. However, it is not clear what language in this more general sense is. In order to examine the language variable in the neo-Whorfian hypothesis, I shall discuss the distinction between ‘language’ and ‘particular languages’ from different perspectives. The reason for this is that this distinction is not consistently made in the neo-Whorfian literature, which has consequences for the arguments in favour of relativity, as is particularly evident in Levinson (2003).

Before discussing the distinction between ‘language’ and ‘languages’, I will briefly describe some approaches to language that differ from the grammatical view of ‘languages’ as stable structures. In these approaches, exemplified in Section 5.1.1, language is discussed in terms of practice/communication. The examples chosen to illustrate this perspective on the study of language may differ in important ways, but they share a view of language as something more than just grammar and lexicon. They are further not the only examples of such a perspective on language in linguistic literature. However, for the present thesis they serve the purpose of demonstrating an approach that does not only focus on particular ‘languages’, like English or Guugu Yimithirr, but on ‘language’ as a part of life. In this view, to use language is to act within particular situations in life.

5.1.1 Language from non-grammatical perspectives

The purpose of the present section is to describe a few examples of different approaches to the study of ‘language’, in order to compare them with how ‘language’ is understood in the neo-Whorfian literature. As different views of language also entail different perspectives on communication, particular languages, linguistic meaning, and language acquisition, the section is divided into subsections addressing these issues. A relatively new development in the study of language is found in integrational linguistics19, a part of

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19 The term ‘integrational linguistics’ was first introduced by Roy Harris (1981) as an ‘approach to linguistic inquiry which would examine language from a different theoretical perspective from that adopted in the Western grammatical tradition and its modern linguistic continuations’ (Harris 1998: 9). It has since then been developed by Harris and other scholars (e.g. Harris 1998; Harris and Wolf 1998; Toolan 1996; Love 2006; Davies and Taylor 2003).
‘integrationism’ which is an approach to human communication in general. Integrational linguistics challenges a number of assumptions that have dominated the field of linguistics during the past century. These assumptions together constitute the position referred to as ‘segregationism’ (e.g. Harris 1998). This refers to ‘the notion that linguistic and non-linguistic phenomena constitute two academically segregated domains of inquiry’, and that the study of languages has its own autonomy within the study of language; that is, that the study of languages is independent of the study of communication, ‘to which it may contribute but on which it in no way relies’ (Harris 1998: 10).

Communication

In contrast to the ‘segregational’ view, integrational linguists emphasize the study of communication as the basis for the study of language.

The integrationist, on the other hand, holds that a theory of language(s) without a theory of communication is vacuous. For the primary manifestation of language is in that gamut of human abilities that are brought into play in the processes of verbal communication. There is no autonomy for linguistics, because we cannot in practice segregate linguistic knowledge from extra-linguistic knowledge. The two domains are integrated, not segregated; and they are integrated in highly complex ways […]

The integrationist therefore rejects the idea that verbal communication involves the kind of activity which allows the linguistic components to be distinguished from the non-linguistic and analysed systematically without reference to the latter. (Harris 1998: 10)

According to Harris, ‘the study of that integration and its complexity is the proper study of language: there is no other.’ The segregation between linguistic and extra-linguistic knowledge is impossible in principle. To the integrationist, the basis of language study is the study of communication.

Unless we understand the process of communication, Harris (1998: 5) argues, we shall end up with a partial and distorted view of language. Communication ‘is not a secondary purpose that just happens to be served by language’. On the contrary, language cannot be divorced from communication. Without communication and communicational needs there would be no human language. We are therefore starting from the wrong end if we suppose that linguistic communication presupposes languages. As he explains, ‘the right theoretical priority is exactly the reverse: languages presuppose communication’ (Harris 1998: 5).

In segregationist linguistics, communication is often described by the ‘sender-receiver’ model.
This model represents communication as a transaction between two hypothetical individuals, A and B. A is the ‘sender’ and B the ‘receiver’. A is supposed to have a message and wishes to send that message to B. In order to send the message, A has to ‘encode’ it in a particular form, and then transmit it via a certain medium to B, who receives it and then ‘decodes’ it. (Harris 1998: 20)

The only components that must be taken into account in this model are: the sender, the receiver, the message, the code, the encoding process, the transmission, and the decoding process. According to Harris, this simple model of communication appears in linguistic studies from Saussure and onwards. The model has some implications that are rejected in the integrationist approach. The most important of these implications are that:

- Communication is ‘telementational’, that is, a process of thought-transference from one person’s mind to another’s.
- Communication is successful only if the concept that started the process in A’s brain is the same concept that is triggered in B’s brain when B decodes the message.
- Successful communication requires a ‘fixed code’. This code is A and B’s common language. If they did not speak the same language, communication would break down.
- The code itself provides the pairing of sounds and concepts. The linguistic sign is taken to be a unit which associates a specific sound pattern and a specific concept in the mind.

Further, the sender-receiver model is entirely decontextualized. We do not know who A and B are, where they are, what they are talking about, what their relationship is, etc. To the integrationist, the sender-receiver model gives a misleading picture of communication. By decontextualizing the speech act in which A and B are engaged, it misrepresents the basic conditions under which communication takes place. There is simply no such thing as a decontextualized communication process. The sender-receiver model of communication proposes a chain of events ‘in which communication is defined by what happens at either end of the chain’ (Harris 1998: 28). The initial and terminal states of the process have to match or correspond. Integrationism offers a different concept of communication in which it is the process itself that matters and not what happens at the ends.

In the next section the integrational account of the relation between ‘language’ and ‘particular languages’ is presented.
The relation between language and languages

According to Harris (1998), an important assumption in orthodox linguistics concerns the relation between ‘languages’ and ‘language’. The orthodox view is that by studying ‘languages’ we can get information about ‘language’. This order of investigation reflects a view of language as a human faculty. As a faculty, a power of the mind, ‘language’ can only be studied inductively through the study of ‘languages’. He argues that this might be acceptable as a basis for linguistics ‘if it were clear that there was such a thing as “the language faculty” and that “languages” were the products for which this faculty was directly and solely responsible” (Harris 1998: 3), but from the integrationist point of view neither ‘language’ nor ‘languages’ seem to be given as objects of inquiry.

On the contrary, linguistic communication appears to involve the integration of very diverse abilities, and the integration is so complex that it becomes problematic to identify or single out what exactly is ‘linguistic’ in it. So, far from being uncontroversially ‘given’ as an ultimate object of inquiry, ‘language’ turns out to be a theoretical postulate which has the main function of providing a hypothetical source for ‘languages’, or a classification under which the study of many different ‘languages’ can be grouped […]

What the orthodox linguist calls ‘languages’, are not uncontroversially ‘given’ objects of inquiry either. Again, on the contrary, what belongs or does not belong to some particular language, who exactly its speakers are, and who has the right to determine such matters are questions that have often triggered not only debate but actions and attitudes of a kind that no human should be proud of […] (Harris 1998: 3–4)

The integrationist point of departure is not the existence of ‘complex cultural objects called “languages”’ but, simply, the attempts by human beings to integrate whatever they are capable of doing into the various activity patterns we call “communication”:

That – if anything – is what is ‘given’; and it is ‘given’ in experience to every one of us, long before we have any grasp of the slippery and tortuous notion of what ‘a language’ is, or how many of them there are, or whether ‘ours’ is different from anyone else’s. (Harris 1998: 4)

As mentioned in the previous subsection, the sender-receiver model of communication implies that communication is a process of transferring thoughts (telementation) by using a fixed code. The notion of telementation and the fixed code together form the basis for what Harris calls the ‘language myth’, that is, the belief in the existence of autonomous systems called languages, which in turn is the foundation of segregational linguistics. According to Harris, a linguistics that is based on the language myth ‘will automatically assume that the linguist’s first task in coming to terms with the speech
of any monoglot linguistic community is to identify “the system” (i.e. the underlying fixed code) that is in use and to analyse it as completely and carefully as possible’ (Harris 1998: 38). That is, the system is taken to be given as an observable object, and it is also taken to be necessary to investigate the system in order to determine what goes on in linguistic communication.

In the ‘segregational’ view, ‘languages’ are systems that exist in a stable form independently of their users. That is, the system is the same whoever uses it. It is available, ‘as “the same system” for a potentially indefinite number of users’ (Harris 1998: 12). In accordance with this, a linguistic community is a community where all members use the same language, and so, the community is defined by reference to the system and not vice versa.

Further, in the segregationist view there is a distinction between the ‘system’ and the use of the system. This distinction is expressed in terms of langue versus parole or competence versus performance. In order to engage in communication, it is necessary to have an appropriate system available. Consequently, the study of language systems takes priority over the study of communication, because communication is merely one consequence of using language. Language in the segregational view is also assumed to be systems that ‘exist or are “represented” neurophysiologically in some way in the heads of their speakers’ (Harris 1998: 13). The system that members of a community supposedly have in their heads is often said to be a system of rules. These rules are held to specify complex pairings of sounds and meanings. Each system determines what meaning is to be attached to any given sequence of sounds that speakers might utter.

In integrational linguistics such ideas about language are rejected. As pointed out above, the study of communication forms the basis for the study of language. Unless we can analyse the relevant communicational processes, there is no foundation on which to construct any rational account of what a language is. As Harris (1998: 11) explains, linguistics ‘must never lose sight of the fact that communication always involves particular individuals acting in particular circumstances’. There is no guarantee that particular individuals are implementing some user-independent system. The concept of a language is:

no more than a rather loosely defined generalization over a range of varied communicational practices. To what extent these practices are systematic is an open question and one to be addressed by reference to particular communicative situations. (Harris 1998: 11)

For the integrationist, any concept of ‘a language’ must ‘ultimately be the product of reflection on linguistic experience, i.e. on the first-order communicational activities of speaking, listening, understanding or failing to understand, etc.’ (Harris 1998: 55).
So the integrationist answer to the question ‘Do languages exist?’ goes like this. If languages are supposed to be fixed codes, one of which provides the necessary basis for successful communication within every linguistic community, then their existence is an illusion. Linguistics does not need an illusion as a theoretical premise. Linguistic communication can be analysed and explained without first trying to define or redefine the language-names that happen to be in everyday use, without proposing any alternative names that might be supposed to have a more ‘scientific’ basis, and without supposing that there must be systems that would qualify for having such a language-name if only we could identify them. (Harris 1998: 56)

This is not to say that there may not be a notion of a language as a ‘second-order construct’, Harris states. It is not impossible for people to agree that they speak the same language, but they may have very different notions of what makes it the same language.

The language-languages distinction may also be approached as a distinction between first, or primal, and second language, as in e.g. Segerdahl, Fields and Savage-Rumbaugh (2005) who discuss culture and language in apes, and especially the language of a group of bonobo apes, among which the most famous one is Kanzi\(^{20}\).

**Primal language versus second language**

Primatologist Sue Savage-Rumbaugh has studied language in bonobos for several decades. In the early 1980s, much to her surprise, she discovered that Kanzi at very young age, without training, had begun to acquire language while accompanying his mother Matata who was receiving linguistic training with the use of a keyboard of lexigrams (abstract symbols corresponding to English words). Kanzi showed that he understood not only lexigrams but also spoken English. The finding that young Kanzi had acquired language spontaneously without training led Savage-Rumbaugh and her colleagues to change their own attitude towards language and language learning, and also the way they interacted with the bonobos. Instead of training Kanzi, they talked to him in English about everyday-life activities, and during everyday-life activities that concerned him, such as travelling in the forest and looking for food. The kind of activities that are normal to apes was enriched with linguistic interaction. In other words, Kanzi learned language in much the same way as a human child learns language, not by training, but by talking and interacting with his/her parents in everyday situations in life.

\(^{20}\) Kanzi (born 1980) together with his siblings and other bonobos was reared at the Language Research Center (LRC) in Atlanta until 2005 when the research was moved to the Great Ape Trust of Iowa (GATI). Kanzi’s language abilities has been documented and analysed in a number of publications (e.g. Savage-Rumbaugh et al. 1993).
According to Segerdahl, Fields and Savage-Rumbaugh (2005: 7), the way Kanzi began to learn language shows that language and culture cannot be abstracted from each other, and they explore language as an intrinsic aspect of culture. The bonobos’ comprehension of spoken English is described as ‘a broader ability to act in connection with words in the circumstances of a humanlike culture’. Segerdahl et al. associate the manner in which Kanzi learned language as part of everyday activities with the distinction between learning to speak for the first time and learning a second language once you already can speak. Learning one’s first language, the ‘primal language’ is a process of ‘enculturation’. This does not mean that language is merely viewed from a cultural perspective, as an entity that is embedded in culture. Language is identified with ‘the broader matrix of everyday life’, and learning a second language later in life is fundamentally different from learning one’s primal language.

When the cultural matrix – the primal language – is in place, it is possible to learn a second language, a foreign language, a specific language, without developing the entire matrix again. What is acquired in childhood, then, is fundamentally different from a specific language. Kanzi’s language development motivates a radical and, as far as we can see, unprecedented distinction between first- and second-language acquisition. (Segerdahl et al. 2005: 7)

Thus, acquiring the primal language is not the same as practicing the vocabulary and grammar of your ‘mother tongue’, which actually is more like the kind of second language learning in which most people take part at school. Segerdahl et al. argue that many researchers fail to see the difference between primal and second language. They treat acquisition of the first, or primal language as a question of learning the lexicon and grammar of a language, in the same way as a second language may be learned later in life. This is the reason previous attempts to teach apes language (including early work at the LRC) were more or less unsuccessful. The researchers tried to teach language as if ‘human language were one of the second languages we learn in school’ (Segerdahl et al. 2005: 20). By way of comparison, Segerdahl et al. discuss ‘Project Nim’, a case of ape language research aiming to teach American Sign Language to a chimpanzee (Terrace 1979). Nim was trained five to six hours a day, five days a week, in a small and bare classroom, ‘with the door closed to life outside the classroom’. Volunteer teachers worked with Nim in the classroom, trying to teach him a vocabulary of hand signs. Despite the many hours of training, the project was considered unsuccessful. Nim did not learn ASL to the extent Terrace had hoped.

According to Segerdahl et al., the comparison between Kanzi and Nim shows that the fundamental difference between primal and second language learning was overlooked in Project Nim. The way Kanzi learned language has parallels to the way humans learn language, they argue.
First-language acquisition is not focused on the grammatical form of sentences, which would impose the erudite perspective of writing on a more natural process that occurs in early childhood, before we undergo language education. First-language acquisition focuses on doing things together, on living together while communicating through any kinds of means: gestures, glances, touches, bites, displays and subsequently linguistic expressions as these are integrated with real-life situations. (Segerdahl, Fields and Savage-Rumbaugh 2005: 21–22)

While second languages (including the official mother tongue as taught at school) are usually described in terms of grammar and vocabulary, Segerdahl et al. describe the primal language in terms of the following design features21 (Segerdahl et al. 2005: 27–93):

**Spontaneity**: Segerdahl et al. suggest that the fact that Kanzi acquired language spontaneously is what most clearly distinguishes him from other apes to whom researchers tried to teach language. Kanzi was not trained, and his language developed naturally in the context of his daily activities. Spontaneity is also characteristic of human primal language, they claim. Human children ‘acquire and use their primal language spontaneously, but learn foreign languages as a conscious effort’ (p. 31). It would be absurd, they argue, to say about children who are talking and playing that they are practising their language, the way we can say about students of French, that they are practising their French. Children are not learning language in the sense that they later can be taught second languages. Language acquisition is viewed as ‘a form of enculturation, as a metamorphosis brought about by the broad variety of stimuli that human culture exerts on socially sensitive and still immature infants’ (p. 31)

**Boundlessness**: While Nim was taught sign language five to six hours, five days a week, ‘as if language were a delimited activity such as playing football, which we can practise for a couple of hours and then relax doing something else’ (p. 33), Kanzi developed language while participating in daily activities. There was no boundary between his language and his life. Segerdahl et al. see parallels to human language. You can say about a student of French that he/she has practised French for a while but will now do something else. As for the children playing and talking, there is no demarcation line between their language and their play. As they explain, this ‘indissoluble connection between our primal language and our life; that is, the

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21 These may be compared to the design features of language developed by Charles Hockett (1963) which, according to Segerdahl et al., to a large extent focus on language as system.
absence of demarcation lines between what we say and what we do, permeates each and every one of our human utterances’ (p. 34).

**Immanence:** If language is acquired boundlessly, that is, cannot be separated from ordinary life situations, then it cannot be activated only occasionally. One might say that ‘Kanzi’s everyday life is immanent or inherent in the language he shares with human caregivers and other enculturated apes. His actions have the imprint of language’ (p. 39). According to Sgerdahl et al., that Kanzi lives in a world permeated with language is visible in him. He underwent a ‘cultural metamorphosis in a human direction, and this affected his body [...] The way his eyes meet your eyes, the way he glances at other persons or cultural objects, the way he gestures towards you or manipulates objects with his hands: everything bears witness to his language’ (p. 39).

**Cultural creativity and generality:** Segerdahl et al. show that Kanzi comprehends creative language from humans and uses lexigrams in a creative manner when communicating with humans. Nim was taught language as if language were a second language, and it was expected that he would learn to use signs creatively in the sense that he would learn to combine signs and construct sentences according to grammatical rules. Segerdahl et al. take a different approach to creativity. Acquiring language is ‘to a great extent developing an ability to give birth to new language for new purposes in new circumstances’ (p. 50). The fact that Kanzi uses the lexigrams in a creative manner, depending on the circumstances, is not peculiar if language is perceived in cultural rather than grammatical dimensions. According to Segerdahl et al., we do not need to ‘start up slumbering syntactic mechanisms in order to make an ape act creatively. It is just the other way around. Successful language acquisition develops a cultural creativity that apes possess in their capacity as social primates […] Linguistic creativity is a variant of the creativity of the primate way of life’ (p. 45). This goes for human language too, Segerdahl et al. state. When we encounter a novel sentence in a new situation, the novel combination of words is produced by our primal cultural ingenuity rather that by unknown syntactic mechanisms. The reason that the same word, e.g. ‘open’, functions creatively in different situations is that we draw on relationships between activities, such as opening doors, wounds, books etc.

**Placement:** One design feature of language suggested by Hockett is ‘displacement’, which refers to the fact that linguistic communication may be about things that are distant in time or space. However,
Segerdahl et al. argue that ‘displacement’ presupposes a formal and grammatical perspective on language, and they replace this feature with ‘placement’. The reason that Kanzi and the other bonobos are able to decide about where to go or what to eat later is that the things they communicate are placed in their everyday activities. Linguistic communications, ‘even about things remote in space and time’, are placed in, or belong to, ‘cultural activities acquired with the primal language’ (p. 55). Kanzi’s language is more powerful than Nim’s because it is ‘more thoroughly placed into the culture where humans speak’ (p. 55). Human talk about remote things is placed in even more complexly interlaced cultural activities, and in this sense it is more powerful than Kanzi’s language. For example, our capacity to talk about an event ‘that will occur in Equatorial Guinea at 10:15 a.m., 12 July 2010, is placed in activities with maps, clocks and calendars, which in their turn are tied to ways of making journeys, collecting information and in general living human lives on our planet that cannot be surveyed once and for all’ (p. 57).

**Gestures and tools:** Kanzi’s mastery of language also includes gestures. Segerdahl et al. describe his gestures as ‘spontaneous expressions of first-language activities’ (p. 59). Gestures appear ‘bizarre and redundant in a grammatical perspective on language, but natural and even essential once we see the difference between the primal language and second languages’ (p. 59). Kanzi acquired the word ‘key’ by using keys to open doors, not by seeing photos of keys on clean tables. When he uses the word ‘key’ he sometimes also gestures with his entire body as if he was using a key. Acquisition of language has changed Kanzi’s physiognomy, which is also visible when he uses tools. According to Segerdahl et al., the idea that speaking ‘consists in pronouncing speech sounds that have linguistic meaning by virtue of grammar, is strikingly true of Latin studies and originates in our standardized techniques of writing and reading’ (p. 61–62). However, primal-language expressions are ‘declared, screamed, preached, asked or hesitated with our entire being’ (p. 62), which is something reading and writing tend to make us blind to.

**Culture-sustained vocal speech and other media:** Segerdahl et al. argue that as a result of his enculturation, Kanzi is able to do things that apes are not generally assumed to be able to, such as blowing up a balloon and blowing out candles. It is often assumed that apes cannot produce speech sounds because they cannot achieve such control over breathing and speech-relevant musculature. Although it is difficult for him to produce speech sounds, Kanzi uses his voice to communicate, and his care-givers understand some of his vocalizations as
spoken words. Visitors however, do not understand Kanzi’s vocalizations. Newly-employed caregivers begin after a while to recognize his vocalizations as words, not just because they get used to his register, but because ‘they have become accustomed to the way of life in which Kanzi’s vocalizations are used and have linguistic significance’ (p. 64). Segerdahl et al. suggest that the reason Kanzi’s caregivers understand him is not that they detect acoustic parallels to spoken English. It is because they understand what the bonobos say to them that they can trace analogies to spoken English.

*Cultural unity:* The fact that people who speak different languages have difficulties understanding each other may fool us into thinking that the unity of specific languages (vocabulary and grammar) is the most basic unity of language. Segerdahl et al. discuss another unity of language. Kanzi’s language is not basically a specific language such as English or Yerkish. When Kanzi is asked questions in English he answers on his keyboard, but this does not mean that he answers in a different language, because he acquired English and lexigrams simultaneously in the same way. The unity of Kanzi’s language coincides with the unity of his humanlike life. When Kanzi and his caregivers understand each other it is because they ‘live the same life with language expressions’ (p. 73). Whether they speak with their voices or point to lexigrams is secondary, for the expressions ‘are used the same basic ways in the same primal language’ (p. 73). In this sense Kanzi answers in the same language in which he gets questions, although he often uses a different medium. To the possible objection that humans speaking the same language understand each other because they speak the same specific language (e.g. English), Segerdahl et al. respond that this is true when we are dealing with communication between people who already speak. When one adult does not understand another adult, this may be because they speak different languages. But if an infant does not understand what the adults say, it is not only because he/she does not speak a specific language, e.g. English. It is misleading to say of a newborn child that he/she does not speak French, Greek or any other language, because this is to treat language merely as specific languages. According to Segerdahl et al., a newborn child has not yet ‘matured into the human ways of life within which French can be substituted for Greek. The cultural framework of languages is not yet been developed’ (p. 75). The notion of mastering a specific language presupposes an already developed primal language.

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22 Yerkish is the name of the system of lexigrams, developed by Duane Rumbaugh, on Kanzi’s portable keyboard.
Non-arbitrariness: The arbitrariness of the linguistic sign is often taken as a property of language itself. Segerdahl et al. evaluate the arbitrariness of the sign starting from the way Kanzi learned language through enculturation. The lexigrams used by the bonobos are arbitrary in that the signs could have been designed differently. However, they function linguistically because they are used as ways of communicating in everyday activities that are not arbitrary. It would have been difficult to cultivate different uses of the signs, and this is a more important aspect, Segerdahl et al. state. It was by exposing Kanzi to ‘a variant of this general and largely non-arbitrary primal culture that he acquired the ability to use signs that linguists would classify as arbitrary and abstract’ (p 79).

Reflexivity: Reflexivity means communicating in language about language. Since the keyboard is a rigid medium of language, there is always negotiation with the apes about what they mean precisely. The bonobos must check that the humans understand their utterances, and the humans must display their understanding so that the bonobos can either accept or reject it. According to Segerdahl et al., the bonobos are able to repeat utterances when asked to, and to indicate desire to speak to a specific person. They are also able to create new names, and teach others the name of things and meaning of words.

In this description of the primal language23, especially the way language is acquired and used creatively in different kinds of everyday activities, linguistic meaning is situated in cultural practices and constantly negotiated. In the following section integrationist accounts of meaning are addressed.

Linguistic meaning

According to Harris (1998), segregationist semantics is tied to the notion of a fixed code, in which the units are given in form and meaning. As he explains, ‘once it is taken for granted that the linguistic sign is a unit determinate both in form and in meaning, the inevitable search is on for some universal way of pinning down invariant, context-free meanings’ (Harris 1998: 68). However, in an integrationist perspective, there are no invariant, context-free meanings.

The integrationist treats meanings not as semantic units established in advance by a fixed code, but as values which arise in context out of particular communication situations. These values are assigned by the participants as

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23 For all design features of the primal language, see Segerdahl et al. 2005: 27–93).
part of the integration of activities involved. It is in this sense that, for the integrationist, communication involves a constant making and re-making of meaning. It is intrinsic to the continuous creative process that our engagement with language is. (Harris 1998: 68)

Integrational semantics ‘starts from the assumption that there are no autonomous signs or systems of signs: which in turn entails that formal and semantic determinacy are not basic properties of signs, either in language or in any other mode of communication’ (Harris 1998: 76). Therefore, there is no answer to the question what a word ‘really’ means. Consequently questions of e.g. polysemy and homonymy that arise in segregationist semantics as a result of the fixed-code doctrine may be dismissed. Further, humans are not only language-users, but also language-makers.

The integrational perspective sees us as making linguistic signs as we go; and as having no alternative but to do this, because language is time-bound. For the integrationist, we are time-bound agents, in language as in all other activities. There is no way we can step outside the time-track of communication. (Harris 1998: 81)

Thus, there are no contextless signs. A sign cannot exist ‘except in some temporally circumscribed context’ (Harris 1998: 81).

Different notions of language have implications for how to approach the issue of language acquisition. This is addressed below, where contrasting views on language acquisition are discussed.

What is learned during language acquisition?

Research in the field of language acquisition focuses mainly on how language is learned. While some theories emphasize the role of the environment for language and conceptual development, others place more weight on innate biases. In an examination of language acquisition theories, Taylor and Shanker (2003) focus on what the child is learning during language acquisition, rather than how he or she acquires it. Taylor and Shanker divide the questions concerning the acquisition of language into two types: the ‘WHAT question’ and the ‘HOW question’. The WHAT question concerns what it is that the child is learning and may be answered in many different ways. For example, we may say that the child learns English or Swahili, or we may say that the child learns the phonology, morphology, syntax and lexicon of e.g. the English language, or to make statements, ask questions, make requests etc. in the English language. There are many possible answers to the WHAT question and each answer to the WHAT question determines the kind of HOW question that researchers will be concerned with. If the answer to the WHAT question is that the child learns the lexicon and grammar of his/her language, the HOW question will be ‘how does he/she learn the lexicon and grammar?’
which leads to further questions concerning how the child acquires grammatical and lexical information, whether that information is sufficient, how the child processes the information, etc.

While different conceptions of what the child acquires lead to different accounts of how it is acquired, the opposite is not necessarily true. Taylor and Shanker (pp. 153–56) illustrate this point by showing that language acquisition theories, such as generativist, social interactionist, and cognitivist theories offer different accounts of how language is acquired.

From a generativist perspective, the child eventually acquires a complex formal system of knowledge. The child’s experience does not provide enough information for the child to learn the system inductively, and thus, language is not really learned but develops as the child is exposed to the right kind of input. This ‘poverty of stimulus’ argument is central to the generativist account of how language is acquired (see e.g. Chomsky 1959).

Social interactionist theories reject the poverty of stimulus argument and claim that the child’s experience does contain sufficient information. Speech directed to a child (‘motherese’) has been shown to be different from adult speech and to contain features that provide the child with information that ‘scaffolds’ their acquisition of linguistic knowledge.

Cognitivist theories of acquisition have looked at e.g. frequency of morphemes in caregivers’ speech and cognitive complexity in morphemes to explain why (for English-speakers) they are acquired in a regular sequence (e.g. Brown 1973). Tomasello (e.g. 2001) emphasizes the importance of the child’s ability to recognize and imitate the adults’ communicative intentions for the task of learning words.

According to Taylor and Shanker, although both cognitivist and social interactionist theories differ from the generativist account of how language is acquired, there is no corresponding fundamental difference as to their conception of what is acquired. Learning morphemes is seen as learning ‘meaning-bearing formal units (known variously as “morphemes”, “formants”, “signs”, or “lexical entries” in the literature)’. These are viewed as ‘discrete, self-contained, code-defined units, each possessing a distinct form and meaning and having an existence independent of any particular act of speech’ (p. 157). Learning a language is viewed as acquiring a grammar, ‘conceived as internally-realized knowledge of a complex system of units (morphemes, words, signs, lexical entries, etc.) and the combinatorial relations between them’ (p. 159).

One way in which the what question influences the approach to the how question is the following. As Taylor and Shanker explain, ‘assumptions about what the child eventually acquires are read “retroactively” into claims about what the child is acquiring at an earlier stage in her development, whether this is at 3 months old or 6 months or 18 months or 3 years’ (pp 159–60). For instance, a child of 9 months stretches out her arm in the direction of a toy. This is often interpreted as a gestural version of the linguistic
act of referring to the toy. However, ‘the study and explanation of HOW children learn is vitiated if it is taken for granted that WHAT they will eventually learn – to refer, to mean such-and-such by a given word, to follow particular rules, to request, to say what they are thinking, etc. – is already present in germinal forms in their early communicative behaviour, only needing conventional refinement and normalization as the child matures’ (p. 160).

As an example, the speech act of ‘requesting’ or asking-for is learned by all normal children growing up in English-speaking communities. Children learn to ask for things that they want and they learn to do this in a variety of ways. Most children between 6 and 12 months develop a gestural complex which involves extending a hand in the direction of an object, directing their gaze to the eyes of the person who might be able to obtain the object for them, and (often) making ‘fretting’ noises. According to Taylor and Shanker, many studies of acquisition treat this behavioural complex as an early instance of a request. Over time, the child’s behaviour will be reshaped and verbalized and socially normalized until it approximates the conventional form of a request. The 9 month-old child is thus described as ‘requesting’ and ‘asking for’ things,

in other words, she is described as if she were producing instances of the same communicational act which 5 year-olds and adults produce, but in an early, ‘primitive’, only-partly-conventionalized form. Such studies therefore ‘retroactively’ interpret the child’s behavior at 9 months as already a request, although not yet one which has all the properties that an adult speaker’s request would have. A request, nonetheless, is what the 9 month-old has produced. (Taylor and Shanker 2003: 161)

Similar claims can be found in the language acquisition literature concerning early instances of e.g. acts of reference, of following particular rules, and grasping the meaning of particular words.

According to Taylor and Shanker, describing the behaviour of a 9 month-old as ‘a request’ may prevent the researcher from examining the child’s behaviour in its own context-specific terms, from examining the way the child’s behaviour functions in the interactions in which it is produced. Identifying a kind of behaviour as e.g. a request, prevents the researcher from asking further questions about what the child is acquiring. The answer is already given and the researcher may move on to the how question.

However, a request is not merely the production of a behavioural complex. An adult who asks for something can do more than just produce the behavioural components of a request, he or she can also ‘contribute to and respond sensibly to another’s reflexive discourse about her behaviour’ (p. 164). That is, the adult is able to participate in reflexive interactions about a communicational act, which are based on mutual knowledge of such an act and its implications.
An adult speaker of English is able to make sense of questions such as ‘Is this what you’re asking for?’ or, ‘What do you mean?’, and to make an adequate reply to them. The adult speaker knows ‘how to explain the act that she has just produced and how to confirm or object to the understanding of her act that is manifested in her addressee’s response’ (p. 165). The 9 month-old child is able to produce the behavioural components of a communicational act, but is not able to participate in reflexive discourse about it. This is an important difference between the 9 month-old’s behaviour and the adult’s request. The adult’s ability to produce a request ‘is inseparable from her ability to participate in the metadiscursive “support-mechanism” provided by such reflexive practices and without which the act of requesting could have no cultural existence’ (p. 165). To request, or ask-for, is ‘a reflexive, culturally constructed, communicational act-category’.

The members of English-speaking cultures continually construct and maintain this act-category metadiscursively; that is, by speaking, writing, and signing about particular forms of behaviour as instances of ‘requesting’ or ‘asking for’ something and by responding in certain culturally familiar ways to such characterizations. (Taylor and Shanker 2003: 166)

Thus, the ability to produce an instance of a request requires some competence in a culture’s reflexive practices, and this point holds also for e.g. referring, meaning something by a word or sentence, or using a grammatical construction. According to Taylor and Shanker (p. 167), once we recognize ‘the cultural construction of these foundational “things we do with words”’, then it should be clear that learning them ‘involves more than just mastering the production of a certain behavioural complex’. It also ‘necessarily involves initiation into the reflexive cultural practices in which they have their roots’. Language is a cultural practice, and language acquisition involves both ‘increasingly sophisticated and normalized forms of behaviour’ and ‘initiation into the reflexive practices by which the speaker’s culture determines what particular behavioural complexes count as instances of, including what they mean’.

Therefore, to learn how to request (or to refer to something, or to mean such-and-such, or to use a particular grammatical construction), a child must do more than refine her behavioural skills; she must undergo this cultural initiation. (Taylor and Shanker 2003: 167)

According to Taylor and Shanker, the implication of the argument is that we need to rethink what it is that children acquire, and that acquisition research should be more concerned with the child’s development of metadiscursive skills, that is, the ability to participate in reflexive interactions. These reflexive abilities are sometimes referred to as ‘second order’ since they concern talking about the products of talking. Taylor and Shanker emphasize that the
development of the ‘second order’ abilities is inseparable from the development of ‘first order’ abilities. This is so because the ‘first order’ abilities concern the production of kinds of linguistic acts which are reflexively constructed and maintained ‘by means of the culture’s everyday discourse about what one does and can do in verbal interaction’. Acquiring the ability to produce the acts thus involves learning WHAT they are, as well as learning to produce the behavioural complex. The first and second order aspects of language are inseparable ‘because it is only by means of their integration that there is a “WHAT the child learns”’ (p. 168).

To summarize, the research presented in Section 5.1.1 represent a different view on language than the view that emerges in the neo-Whorfian case studies in Chapter 3, or in the discussion about relativist claims reviewed in Chapter 4. These ‘non-grammatical’ approaches to language will be contrasted to the neo-Whorfian view in the remaining sections of Chapter 5. In the immediately following section I discuss the use of the term ‘languages’.

5.1.2 Languages

As shown in the previous section (5.1.1), there are strictly speaking no discrete objects called ‘languages’. There is no way to draw a line between two languages or demarcate the limits of e.g. Tzeltal, or definitely determine who is and who is not a speaker of Tzeltal. However, it is still possible in everyday speech to refer to English or Tzeltal as languages in a way that makes sense, and for linguists to map and describe different languages. Grammatical structures in a language, or portions of the vocabulary, such as the Tzeltal UP/DOWN vocabulary, can be discussed as features of particular languages. These kinds of features may differ radically between languages. For example, in Tzeltal there are many different verbs for eating depending on the characteristics of what you eat, and different verbs for carrying something depending on how you carry it and the shape of what you are carrying (Brown 2001: 528). This is a semantic specificity that lacks correspondence in many languages. In the present thesis, ‘languages’ or ‘particular languages’ are used when discussing properties of languages, such as the language-specific vocabulary of Tzeltal. What is questioned in the thesis is not the investigations into linguistic diversity or the empirical findings, that is, the descriptions of ‘languages’ such as Tzeltal or Yucatec. What is questioned is the interpretation of the empirical findings, which is based on the view that ‘languages’ exist as demarcated objects.

The following section investigates how ‘language’ and ‘languages’ are used in the case studies presented in Chapter 3, and the implications this has for the arguments in favour of linguistic relativity.
5.1.3 Language versus languages in the neo-Whorfian literature

First, I shall return to the line of argument (see Section 3.4.4) in which Levinson tries to solve the chicken-and-egg problem of the correlation between language categories (LC) and cognitive coding (CC), and point out a weakness in the argument. My purpose in pointing out this weakness is to highlight the consequences of confounding language in the sense of ‘particular languages’ with language in a more general sense. Levinson argues that language is what causes people in a community to converge on a locally predominant cognitive coding style (Levinson 2003: 211–12). He maintains the hypothesis that language categories (LC) determine cognitive coding (CC). In order to make the point that language must be the explanatory factor, Levinson assumes the opposite, that cognitive coding is not determined by language, but is only reflected in language. He then poses the question how, under such an assumption, all members of a community come to share a locally predominant coding style. He considers and rejects various cultural and ecological factors, and reaches the conclusion that the people of a community converge on a non-verbal coding strategy because they have learned to do so by communicating with each other. And so, even if cognitive coding should not be determined by linguistic categories (which is the hypothesis), it is still language (through its communicative function) that causes people of the same community to share a cognitive coding style.

This line of reasoning may be used to illustrate how different aspects of language are confounded and enter into the argumentation for linguistic relativity. Language here denotes some communicative function of language as well as the linguistic categories of particular languages. This is not entirely in line with Levinson’s formulations of linguistic relativity, where the linguistic parameters of particular languages are held to influence thinking. First, Levinson proposes that linguistic parameters determine cognitive coding style. That is, ‘given facts about a language and its use, one can predict the way in which subjects will code spatial arrays for non-verbal purposes such as recognition, recall or inference’ (Levinson 2003: 211). The linguistic parameters in this case are facts about the terms for spatial expressions and their meaning in a specific language. Second, there is linguistic communication.

Considering that the hypothesis under investigation in Levinson (2003) is whether properties of a particular language may affect how speakers of the language think, the fact that people communicate should not be relevant, since communication is a function of language in a more general sense. In Levinson’s argument, linguistic communication is the explanation of why people in a community develop the same concepts, but it does not explain why people in the community develop particular types of concepts e.g. absolute frames of reference, which is what the relativity hypothesis (at least in
the neo-Whorfian studies) is all about. This is a weakness in the argument. Bringing in a general function of ‘language’ does not support the hypothesis that specific parameters of different ‘languages’ have an impact on thought. This weakness in itself is of minor importance for the present study. What I am trying to show is that the argument illustrates some problematic points about the claim that structures of ‘particular languages’ influence thought:

1. It illustrates the fact that the term ‘language’ is used in different senses in the neo-Whorfian research.
2. The confounding of different aspects of language creates inconsistencies in the relativistic argumentation.
3. The argumentation illustrates the importance of the communicative aspect of language. Even from a relativistic point of view, the properties of particular languages are not enough to explain the fact that people in a community develop a common ‘cognitive style’. Thus, the communicative aspect of language is obviously relevant to the issue of language and thought. But it does not seem to fit in well with the neo-Whorfian formulation of this relation, which focuses on particular languages and their features. This suggests that the relativity hypothesis may not be the best approach to the language-and-thought relation.
4. The argument illustrates the difficulty of ‘proving’ causality leading from language to thought. This too suggests that the idea of influence by one variable on another may not be the best approach to the language-and-thought issue.

Here it should be noted that the notion of ‘communication’ itself has many aspects. Communication can be viewed as a process of transmitting messages between a sender and a receiver, or as a more complex matter. Regardless of which view Levinson entertains in his argument, he has shifted focus from linguistic representations in speakers of a specific language to some form of communicative aspect. The consequence of this for the ‘architectural’ argument is that linguistic representations are obviously not sufficient to have an impact on thought. In one way or another, even the neo-Whorfian argument makes use of ‘communication’.

Different uses of the term ‘language’ also appear in other parts of the relativity literature. Gentner and Goldin-Meadow (2003b) illustrate what they claim to be the view of most language researchers with the following quotation from Devitt and Sterelny (1987), who apparently hold the view that experiments have only tested banal and weak versions of the hypothesis.

[T]he argument for an important linguistic relativity evaporates under scrutiny. The only respect in which language clearly and obviously does influence thought turns out to be rather banal: language provides each of us with most of our concepts (Devitt and Sterelny 1987: 178)
Gentner and Goldin-Meadow quote Devitt and Sterelny to illustrate what they find to be a ‘schizophrenic’ approach to the question. How can one dismiss the relativity question as banal, and at the same time state that language provides us with most of our concepts, they ask.

The language-and-thought question is dismissed as banal and unimportant, yet in the same breath it is stated (almost in passing) that language provides us with most of our concept—a view far stronger than that of even the most pro-Whorf researchers. (Gentner and Goldin-Meadow 2003b: 3)

This seemingly inconsistent view might result from different ways of perceiving language. The Whorfian hypothesis presupposes a grammatical perspective on language. It does not follow from the passage cited that ‘language’ is to be understood that way. It might just as well mean language as practice or communication, and, one could claim that language in that sense does provide us with most of our concepts (I am not hereby suggesting that Devitt and Sterelny would have this broad notion of language). In other words, the claim that language provides us with our concepts is not necessarily a Whorfian claim, unless language is understood as a particular language.

To summarize Section 5.1.3 so far, the distinction between ‘language’ and ‘particular languages’ is not always maintained in the neo-Whorfian literature. The way ‘language’ and ‘languages’ are confounded illustrates that there is some confusion as to what the issue really is. It also illustrates the difficulties of ‘proving’ the proposed causal relation.

Having said this about how different uses of the term ‘language’ enter the relativity literature, and how this affects the arguments for the relativity claim, I shall concentrate on the claim that speaking ‘a language’ or using some part of the lexicon or grammar in ‘a language’ influences the way speakers of the language think. What is ‘a language’ and what is the relation between ‘a language’ and ‘language’?

The claim that structures in different languages, e.g. Guugu Yimithirr or Yucatec, influence how speakers of these languages think, is only possible to maintain if language is understood in terms of stable structures with established meanings, that is, as a fixed code. As pointed out earlier, to assume that there is a causal relationship between different languages and things outside of the language is also to assume that ‘a language’ is a separate variable. This view of language has implications for the understanding of linguistic meaning. The relativity hypothesis states that linguistic categories, through their meaning, influence peoples’ thinking. The proposed linguistic influence on thought is an influence of semantic parameters of a particular language on cognition.
Linguistic relativity is a theory primarily about the nature of meaning, the classic view focusing on the lexical and grammatical coding of language-specific distinctions. In this theory, two languages may ‘code’ the same state of affairs utilizing semantic concepts or distinctions peculiar to each language; as a result the two linguistic descriptions reflect different construals of the same bit of reality. (Gumperz and Levinson 1996b: 7)

In this view, ‘the nature of meaning’ is such that semantic distinctions belong to the particular languages, which entails that meaning is established and inherent in a language.

If a language lacks such a semantic parameter, there is a good chance that the speakers of it fail to think in terms of those parameters too – as shown, for example, by the fact that English or Dutch speakers do not code spatial scenes in absolute coordinates. (Levinson 2003: 302)

This view of meaning is part of Levinson’s view of language as a system of internal representation.

Language is a public representation system – a system shared by all in a community – at the same time that it is an internal representation, a system into which we can code thoughts as we prepare to speak. Without fundamental convergence in linguistic representations across individuals, communication would be impossible. (Levinson 2003: 113)

The view of a language as a self-contained system, as a fixed code, is necessary for the way the arguments are made for the neo-Whorfian hypothesis and for most of the arguments against it as well. There could be no discussion of an influence of semantic parameters on thinking unless the semantics, the meanings of words, are taken to belong to the language, that is, to be independent of the situations in which the words are used.24

The notion of language as a fixed code independent of context makes possible the separation of language, thought and culture into three separate variables. A fixed code is independent of its users and the practices they engage in. A fixed code is the only view of ‘a language’ that permits a description of the thought-language relation as a claim of linguistic relativity.

As for the relation between ‘particular languages’ and ‘language’, ‘language’ seems to be a general aspect of ‘particular languages’. Levinson brings in the communicative function of language in order to show that it is

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24 Note that arguments against effects on non-linguistic cognition are based on the same view of meaning as inherent in the language. Munnich and Landau (2003: 116), though denying any effect of language on ‘non-linguistic representations’, claim a limited effect on ‘linguistic representations’. They argue that ‘children acquire the semantic distinctions pertinent to their language’ early in life, and that there is clear evidence that ‘learning a native language results in significant reorganization of the speaker’s phonological, syntactic, and semantic representations’ which is hard to undo later in development.
‘language’ and not e.g. literacy or ecological factors, that leads his subjects to respond the way they do in the non-verbal tests. However, communication in his argument amounts to using the same code, or system, and thereby developing identical spatial concepts. Communication requires that people share the same system.

According to Lucy (1997), the linguistic relativity proposal, ‘forms part of the general question of how language influences thought’. As mentioned at the beginning of Chapter 5, the influence of language is divided into three levels. The first level concerns how having a code with a symbolic component (speaking any natural language) transforms thinking. The second level concerns how speaking a particular language influences thinking. The third level concerns whether using language in a particular way (e.g. schooled) may influence thinking. Although Lucy makes a distinction between particular languages and a broader notion of language, every level of influence concerns ‘particular languages’. It is either the structure of ‘a language’ or using ‘a language’ in a specific way, or having ‘a language’, i.e. having ‘a code’, that transforms thinking. Any broad notion of language is seen an aspect of having ‘a particular language’.

Bowerman and Choi pose the question of whether language influences non-linguistic cognition, and whether different languages influence it in different ways. The relation between ‘different languages’ and ‘language’ is of the same kind as in Lucy (1997). Does having a code influence thought? That is, the indefinite term ‘language’ is equal to ‘speaking a language’ (any language).

To summarize, the neo-Whorfian studies primarily investigate ‘particular languages’ and the influence they may have on thinking. The term ‘language’ is used in the argumentation in a manner that implies that ‘language’ and ‘particular languages’ are confounded. In the cases where a distinction is explicitly made between ‘particular languages’ and ‘language’, ‘language’ is described only in relation to the ‘particular languages’, as a common aspect of the particular languages. In the following section the distinction between ‘language’ and ‘languages’ is treated again, now from a different point of view.

5.1.4 Language versus languages from a sociocultural perspective

In the present section, the distinction between language and languages will be addressed again, now from the point of view that ‘language’ is not some general aspect of using one or several of the world’s particular languages, but something that relates to the sociocultural practices of human life.
From this perspective, the actual situations in which language is used are the point of departure, not the particular languages, as is the case in the neo-Whorfian studies. People using language do not just utter words according to the rules of their language. They are engaged in a practice, they do something. Meaning is not inherent in linguistic forms, but is constantly recreated in the actual situations of communication. This does not entail that meaning is random, but neither is it fixed ahead of an act of communication.

Within this approach, in which language and linguistic meaning are always dependent on context, how can we understand ‘languages’? It is still possible to refer to e.g. Guugu Yimithirr or English as languages in a meaningful way. But what are they? They can certainly not be the stable structures of meaning they are described as in the relativity literature. At most they can be understood as descriptions in terms of lexicon and grammar of linguistic practices, as models of language use. This is not to say that models are not useful. Descriptions of the semantic parameters in particular languages are useful for displaying differences between the languages. They may reveal something about what speakers of different languages need to know as speakers of these languages, and reflect sociocultural practice. The practices in which we use the word ‘north’ for example, involve the cardinal directions, maps, compasses, etc. The ‘UP/DOWN’ vocabulary in Tzeltal mirrors the use of a land slope as a tool for spatial description and orientation. Segerdahl et al., who do not dismiss the notion of language as a specific language (e.g. English), but admit that it is relevant for many practical purposes, explain that:

The dichotomy between specifically linguistic knowledge and background knowledge about the world is the result of using a perfectly legitimate notion of language (that of a second language) in an illegitimate fashion (as a model of the primal language). (Segerdahl, Fields and Savage-Rumbaugh 2005: 77)

From the view of language as a general integrated practice, and languages as descriptions or models of communicational practices, what becomes of the relation between language and thinking? In the neo-Whorfian studies, the relation between languages and thought is investigated as a possible causal relation leading from a cognitively represented language system to non-linguistic thought. If instead, the relation is addressed from the point of view that language is integrated practice, there can be no causal effect of linguistic structures. As descriptions of verbal aspects of linguistic practice, lexical or grammatical features of Guugu Yimithirr or English cannot serve as explanations for why people of English-speaking or Guugu Yimithirr-speaking communities think or act differently. The reason for cognitive and behavioural diversity must be sought elsewhere (if indeed there is a ‘reason’). Language, in the sense of practice/communication, is primary to structures and patterns that may be detected in descriptions of particular languages.
from an imposed grammatical perspective. Linguistic meaning is not given in advance, but arises in linguistic communication.

I have pointed out in previous chapters that my aim is not to challenge the empirical findings of neo-Whorfian studies. However, the studies may be interpreted differently according to what view of language that is adopted. For instance, if the scholars who have investigated the Guugu Yimithirr language and communities are correct, the speakers of Guugu Yimithirr use approximate equivalents of south, north, east and west to describe directions and spatial relations. They do not use equivalents of left and right. This may be viewed as a primary fact, and not a consequence of linguistic categories. Speakers of Guugu Yimithirr talk about space in this specific (and unusual) way, and apparently no other way has been established in their community, in their culture. The spatial terms they use are part of the practices they engage in when they for some reason point in a specific direction, or tell someone where to find what they are looking for etc. The important aspect is not what words they use but what they do with the words. From this point of view, there is nothing mysterious in the relation between the spatial terms, what they mean, and how people think about space. There is no variable that makes a Guugu Yimithirr speaker use absolute coordinates. The fact that Guugu Yimithirr speakers, when they solve spatial tasks, make use of absolute frames of reference, is not a consequence of their having absolute semantic representations. The way this group of people talk about space is better understood in terms of a kind of practice that may (or may not) involve the use of certain linguistic forms. However, in order to investigate the relation between language and thought as a hypothesis between variables it is necessary to distinguish between them. This is the reason why neo-Whorfian studies distance themselves from the real lives of their subjects and work in experimental settings searching for a non-linguistic kind of thought, to see if it correlates with language, described in terms of grammar or lexicon.

Rather than whether ‘a language’ affects the thought of its speakers, it would be better to ask how the entire cultural practice evolved. However, such historical questions are not within the scope of the present thesis.

Here, it must be emphasised that discussing the distinction between ‘language’ and ‘languages’ from a sociocultural perspective, and interpreting the empirical facts from that perspective, is not a question of redefining ‘language’ and ‘languages’ in order to discuss them as variables in the way the neo-Whorfians do. It is a question of determining the relative priority between (linguistic) practice in real life situations and linguistic form. What is the right order to investigate practice and linguistic form? From the sociocultural perspective, in order to shed light on the typical behaviour of a group of people, it makes no sense to examine the linguistic forms in isolation from the contexts in which they have been used, or the so-called non-linguistic thinking.
To summarize Section 5.1, the distinction between ‘language’ and ‘languages’ is important to the discussion of the language-and-thought relation. The neo-Whorfian claim is that particular languages influence thinking, but the distinction between languages and language is not always upheld. This is of some importance since the claim that language in a general sense influences thought is something other than a claim that grammar or lexicon influence thought. Further, the neo-Whorfian studies describe particular languages under the assumption that these are real entities with an explanatory value with regard to cognitive diversity. If instead focus is shifted from linguistic form to what people do with language in real situations in life, the distinction between language and languages takes on another meaning. The notion of ‘a language’ as it is understood in the relativity literature disappears. But one of the underlying assumptions behind the linguistic relativity hypothesis is the existence of objects called languages. From a sociocultural perspective, language in the sense of practice/communication is focused, and particular languages are seen as models or descriptions of linguistic practice that may be important and useful but are not stable structures.

The way ‘particular languages’ are viewed in the relativity literature relates to the division between language and non-language. In the next section, the separation of language, thought and culture into three variables will be treated.

5.2 Language versus non-language

In the previous section the distinction between ‘language’ and ‘languages’ was discussed from different angles. I argued that the relativity hypothesis is impossible to maintain unless ‘a language’ is conceived of as a fixed code, that is, as a stable system in which linguistic meaning is established in advance. In the present section, I shall discuss how ‘culture’ and ‘thought’ are similarly treated as distinct ‘variables’ in the relativity discussion.

In the debate on linguistic relativity, the arguments that linguistic structures influence non-linguistic thinking are countered by scholars (e.g. Munnich and Landau) who argue against an influence on non-linguistic thinking, but in favour of an influence on ‘linguistic representations’. Thus, we have a thought variable, ‘non-linguistic thinking’, that may or may not be influenced by language, but that in any case is outside of language.

There is also a cultural variable. In the neo-Whorfian studies, one part of the argumentation for the influence of language on thought is to consider other possible factors that might account for the outcome of the non-linguistic experiments. This is when ‘culture’ is discussed (and dismissed) as a possible third factor that might have an impact on thought. When cultural factors are considered, culture is usually discussed in terms of literacy, relig-
ion, material culture, or along the lines of ‘Japanese culture’ as opposed to ‘Yucatec culture’ for example. Everett (2005) argues against linguistic relativity on the grounds that the direction of causality is wrong. In his opinion, culture is a factor shaping grammar. Thus, there are at least three variables involved in these discussions of causal relations. Is it really possible to make a neat distinction as to what is culture and what is language? What is cognition and what is culture? A few examples from the relativity literature will help to illustrate the difficulty in determining what is what.

As described in Section 4.2, one of the ‘gaps’ in the Pirahã morphosyntax is the lack of grammatical number and terms for quantification. According to Everett (2005) this gap follows from a cultural constraint, ‘the restriction of communication to the immediate experience of the interlocutors’. Everett suggests that there may also be a cognitive consequence of this constraint, namely, that the Pirahã are unable to count. In this case, ‘culture’ is held to shape ‘language’, and possibly also cognition. But could not the fact that the Pirahã do not count be viewed as a cultural fact rather than a cognitive one?

According to Levinson, the Guugu Yimithirr and the Tenejapan people do not use relative frames of reference when solving spatial tasks, neither in their everyday lives, nor in experimental situations. In this case, ‘language’ is held to shape ‘cognition’. Could not the way these groups of people use absolute frames of reference be thought of as cultural, rather than linguistic behaviour?

The remainder of Section 5.2 will examine the ‘culture’ and ‘cognition’ variables as they appear in the neo-Whorfian case studies. In what senses of ‘culture’ and ‘cognition’ is it possible to treat them as distinct variables?

One obvious reason for treating them as separate variables in the neo-Whorfian studies is that linguistic relativity is formulated as a claim of causality between language and thought. To assume that there is a causal relationship is to assume that there are (separate) variables in the relation. That is, the division between language and thought is presupposed at the outset through the formulation of the hypothesis. Accepting for the moment this distinction, I shall discuss the variables of culture and non-linguistic cognition in the neo-Whorfian studies.

Cognition

Cognition is a broad term that refers to various brain functions involved in knowledge and information processing. The relevant aspect of cognition for the present study is what is referred to as ‘non-linguistic thought’ in the neo-

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25 The use of the term cognition varies considerably between disciplines. There is no exact definition of ‘cognition’ or how it relates to ‘thought’ or ‘thinking’. The terms are used alternately in the neo-Whorfian case studies, and there is nothing to suggest that they discriminate between ‘thought’ and ‘cognition’.
Whorfian studies. In Lucy and Gaskins (2001 and 2003) the cognitive variable is classification preference. Having looked at a pivot object (e.g. a plastic comb with a handle), the subjects were asked which of the two alternate objects (a wooden comb with a handle and a plastic comb without a handle) was more like the pivot object. This choice between material and shape is the outcome of the cognitive variable. It reflects how speakers of the two languages ‘might be interpreting reality differently beyond the act of speaking’ (Lucy and Gaskins 2001: 279).

In Levinson (2003) the non-linguistic outcome is the choice of frame of reference when solving non-linguistic tasks. The kind of thinking that the tasks are meant to reveal is the underlying cognitive processes that are required to support spatial linguistic performance. That is, in the non-linguistic tasks, the purpose is to ‘tap’ the underlying processes directly. The notion of a common ‘cognitive style’ is somewhat problematic in that it implies that every member of a community conceives of space in the same way.

It has been questioned whether the outcome of the non-verbal tasks in e.g. Levinson (2003) and Lucy and Gaskins (2001 and 2003), really is non-linguistic thinking. Munnich and Landau (2003), and Li and Gleitman (2002) question the validity of the non-verbal responses on the grounds that language may be being used to solve the tasks. The subjects may linguistically encode what they see before they turn to the Recall table (Munnich and Landau 2003), or the subjects may be making a pragmatic guess about the investigators’ intentions. The ambiguous command to make the array ‘the same’ may serve as a cue to the subjects (Li and Gleitman, 2002).

But assuming that the tasks are not linguistically mediated in that way, what makes the variable ‘non-linguistic’ just because the person is not talking or listening to speech when solving the task? There are several aspects to this question. Is there a level of ‘non-linguistic’ cognition as opposed to linguistic cognition? In what sense of language is it non-linguistic? What characterizes this ‘non-linguistic cognition’?

First, as we have seen in Chapter 3, Levinson conceives of spatial processing as depending on a very complex layering of spatial representation systems (e.g. propositional representations, geometrical representations, cognitive maps, etc.). Levinson’s central question is how deeply into the inner representation systems the distinction between absolute and relative frames of reference go. His main concern is with the ‘architecture of the mind’ and what can be learned about this through cross-linguistic studies. The following analogy illustrates his line of reasoning.

[Just like we can trace blood flow by injecting radioactive isotopes, or trace the course of an underground river system by dumping dye into a river before it goes underground, so by focussing on exotic semantic parameters and seeing where they turn up in ‘inner space’ – the range of internal representation systems – we can perhaps find out something important about our inner lan-]
languages or representations and how they talk to one another. (Levinson 2003: 280)

How do we know that all these systems of representation exist in the way they are described here? The extent to which Levinson’s picture of the mind is realistic on the whole I am in no position to judge. As for making a distinction between a linguistic and a non-linguistic level, this is part of the (neo-Whorfian) linguistic relativity hypothesis, which is formulated as a claim of influence on non-linguistic thought. That is, some level of non-linguistic thought must be assumed. However, what is it in the subjects’ remaking of the arrays or choice between objects, that shows that they engage in a different kind of thinking than the kind of thinking they employ while speaking? How do we know that the responses are ‘non-linguistic thinking’? Levinson and Lucy & Gaskins claim to have designed the tasks so as to capture non-linguistic thinking only, but an underlying assumption of course is that there are levels of non-linguistic thinking.

Second, in what sense of language are these responses ‘non-linguistic thinking’? What notion of language does ‘non-linguistic’ refer to? If language is understood as features of particular languages, as it is in the neo-Whorfian literature, then there is clearly a linguistic variable and a non-linguistic one, because words and grammar are properties of particular languages. Thinking, e.g. spatial computation, is not as such connected to grammar or words. In this sense, it is a question of non-linguistic thinking.

However, the kind of thinking that is referred to as ‘non-linguistic thinking’ may be part of ‘language’ in a more general sense. Even if the informants do not speak while performing the tasks, it is as speakers of Guugu Yimidhirr, Tzeltal, English or other languages that they have developed their ability to compute spatial relations the way they do, that is, developed their ‘cognitive style’. This may seem like a Whorfian argument but it is not. It means that learning to be a speaker of a language means more than just learning to produce utterances with fixed meanings according to the rules of a particular language system. It means learning to talk, to act in certain ways, linguistically and otherwise. Thus, in a broader sense of language, ‘cognitive style’ has to do with language, not in the sense that it is induced by grammatical or semantic properties of particular languages, but in the sense that language is ‘placed’ in the activities of life where cognitive style develops (Segerdahl et al. 2005).

Third, what view of cognition emerges from the neo-relativist reasoning? As pointed out above, it must be presupposed that there are levels of non-linguistic thought. Further, the non-linguistic cognition in Levinson’s model is static, and this follows from the static view of language. According to neo-Whorfian studies, the semantic parameters of a language force an adjustment of non-linguistic thought. In response to ‘community-wide conventions about what linguistic expressions mean and how they are to be used’, the
members of the community develop ‘a way of thinking in which the immediate, unreflective memory coding matches the kind of coding required to describe an arbitrary spatial array’ (Levinson 2003: 170). The language system, consisting of context-free established meanings, thus forces corresponding context-free cognitive patterns. That is, just as the language variable (portions of grammar or lexicon in particular languages) is defined and studied without reference to real situations of language use, so too is the cognition or thought variable (the community’s common cognition or common ‘cognitive style’). Thought is studied in other settings than the situations in which the speakers normally talk, act, and think. The neo-Whorfian studies investigate special kinds of thinking, e.g. spatial thinking or classification preference. They do this by testing their subjects in laboratories in order to capture the ‘non-linguistic’ thinking in a scientific manner – which cannot be done in real-life situations. At the same time, they hold the non-verbal test responses, the recorded non-linguistic thinking, to be representative of the kind of thinking that their subjects normally perform in real-life situations. That is, the patterns of thought are laid down once and for all by the categories of language, prior to the activity a person engages in. This is the neo-Whorfian explanation for the outcome of the non-verbal tests, that in most cases, the subjects responded in accordance with the categories of their language.

If instead a non-grammatical view of language is adopted, and the real-life activities are brought into focus, the results of the non-verbal test cannot be explained by reference to linguistic categories. Since there are no fixed semantic structures shared by members of a community, thinking (of the kind discussed here) cannot be patterned by language in the way the neo-Whorfians claim. On the contrary, from the perspective that language is an integrated practice (or a cultural framework), learning to use words in a meaningful way by participating in practices also means learning to think in a way that is required for the particular practice and is sustained by the practice.

For example, when a child learns the numerals for the first time and learns to add two and two, what is it that he or she learns? Is it a language? Or is he or she learning to count? A child who learns the numerals for the first time learns ‘to count in the relevant life situations, rather than to speak a specific language’ (Segerdahl et al. 2005: 74). That is, the child learns the specific kind of thinking that is required to put two and two together, and at the same time the counting practice sustains this kind of thinking. Both the numerals and the specific kind of thinking belong to the practice of addition. Similarly, acquiring the ability to estimate directions or recount the order between objects using e.g. the UP/DOWN vocabulary is not primarily learning e.g. the words ‘uphill’, ‘downhill’ etc., but amounts to acquiring a skill through participating in practice. The UP/DOWN vocabulary is placed in the practice, as are the calculating, reckoning and estimating. The particular kind
of thinking belongs to the practice. Even the thought patterns that are ‘re-
vealed’ in the non-linguistic tasks of the neo-Whorfian tests belong to prac-
tices of some kind. From this perspective the neo-Whorfian explanation of
the test outcome has to be rejected. But in that case, how can we account for
the outcome of the non-verbal tests? An alternative hypothesis is required.

In the neo-Whorfian studies, the hypothesis is that context-free structures
of meaning have laid down fixed patterns for cognition, and the results of the
experiments are taken to support the hypothesis. An alternative hypothesis
could be that the subjects have developed a specific kind of thinking in spe-
cific kinds of practice, and when participating in similar practices the sub-
jects would be expected to perform the same kind of thinking. Although the
‘test practice’ is probably very different from the activities the subjects norm-
ally engage in, the tasks are still recognized by the subjects as spatial tasks,
or related to shape or material. It could be argued that the tasks of the tests
are sufficiently similar to familiar practices to evoke the same kind of think-
ing, or rather make the subjects perform the same kind of activity as in an
every-day situation. Perhaps the finding in Lucy and Gaskins (2001), that
speakers of English and Yucatec interpret reality in accordance with their
grammars ‘beyond the act of speaking’, just shows that the act of speaking
(uttering correct forms) is not the most important aspect of doing classifica-
tions in real life.

To summarize, in the neo-Whorfian studies the ‘cognition’ and ‘language’
variables are both studied without reference to real-life situations. The way
non-linguistic thought is studied reveals a static view of both language and
cognition as independent of situations and activities in normal life. The lan-
guage and non-language distinction also concerns ‘culture’, which is treated
as a variable in the relativity discussions, as will be described in the follow-
ing section.

**Culture**

Like ‘cognition’, ‘culture’ is a broad term and I shall not attempt to define it,
but merely describe how it is used in relativity arguments.

According to Lucy and Gaskins (2003), the evidence for ‘the primacy of
language (rather than culture)’ is reinforced by ‘evidence from other lan-
guages associated with markedly different cultures’. The Japanese and Yu-
catec languages are similar in that they rarely mark plurals and obligatorily
use classifiers in count constructions. Further, speakers of the two languages
have shown similar classification patterns in experiments, despite cultural
differences. The fact that they perform in a similar way in the experiments is
thus explained by reference to grammatical similarities. The use of numeral
classifiers is apparently not regarded as an aspect of culture. Culture in this
case is perhaps something like ‘a general lifestyle’. Similarly, the ‘Japanese
culture’ is said to be ‘associated’ with the ‘Japanese language’, implying that culture and language are different things.

In Levinson (2003), pairwise comparisons are made between groups of people who live in the same country or region but speak different languages (Tenejapan Tzeltal, Mopan, and Yucatec). This is considered a more restricted test of the Whorfian hypothesis because the groups live ‘in the same nation state and share many aspects of ecological environment and cultural tradition’, but differ ‘in the critical linguistic feature in question’, that is, usage patterns for spatial frames of reference. Levinson also compares two Tamil-speaking groups that share ‘most of the material and cultural background’, but use different frames of reference in language. The outcomes of the non-linguistic experiments for these groups corresponded to the linguistic patterns for each group, and Levinson concludes that there is evidence that ecological factors, material culture, religion or other cultural variables ‘do not seem to have a decisive role to play in non-verbal coding’. Apparently then, the way the people of a community typically use absolute or relative frames of reference when talking about spatial relations is characterized as a property of their language, not of their culture. Similarly, when other possible explanations for the results of the non-linguistic experiments are discussed, e.g. religion, these are considered and discarded as possible cultural variables that might influence thinking about space. This categorisation into linguistic and cultural is of some importance for the argumentation in favour of relativity. The way members of communities talk and think about space, or shape and material, or the way objects are connected (tightly or loosely), using specific terms, is considered linguistic practice, language usage patterns, and not cultural practice, whereas e.g. religion or literacy are considered cultural variables.

Without any pretension of giving a definition of ‘religion’, I shall use ‘religion’ as an example to comment on this categorisation into ‘cultural’ and ‘linguistic’. When Levinson concludes that religion or other cultural variables do not have a decisive role to play in non-verbal coding, he obviously makes a distinction between linguistic and cultural practice. Religion is ‘culture’ and not ‘language’. It may be right not to explain spatial thinking in terms of religion, but it is interesting to note how different aspects of human life are labelled.

When religion is discarded as a factor influencing cognitive style, I understand this to mean that people speaking similar languages code for memory the same way regardless of religious affiliation. However, ‘religion’ (or religious practice) as well as other ‘cultural variables’ probably involve language and the use of specific terms in the same way that spatial description and computation involve language. Needless to say, religion is an important aspect of culture, but it is also tied to a certain vocabulary, ways of speaking and communicating. Calling it a cultural factor (as opposed to the use of e.g.
absolute frames of reference, which is held to be a linguistic factor) is to disregard its linguistic dimension.

In other words, if thinking and speaking about e.g. religious matters using specific terms is defined as ‘culture’, why are talking and thinking about space, using specific terms, not also an aspect of culture? That Levinson considers talking and thinking about space to be language use and not culture is clear, otherwise he would be discussing the role of culture. In a response to Everett, who does claim a role for culture in shaping language and cognition, Levinson (2005: 638) denies this, arguing that a language is ‘a crucial part of a culture and is adapted to the rest of it’ and that neo-Whorfiens are interested in how ‘culture gets into the head’. He explains that language seems to play a crucial role here, since it is ‘learnt far earlier than most aspects of culture, is the most highly practiced set of cultural skills, and is a representation system that is at once public and private, cultural and mental’. According to Levinson there is no ‘simple dichotomy between language and culture’, but apparently language use itself (such as the use of spatial words) does not qualify as ‘culture’. That is, the arguments for the primacy of ‘language’ rather than ‘culture’ do not allow for the view that linguistic practice or language use (the way we speak about things) is cultural practice.

If instead focus is directed towards the cultural aspect of language, what is done with language in different situations, the various human activities – spatial reckoning, religion or other ‘cultural variables’ – may be interpreted as human practices, which are all tied to language. From this perspective, if the practice people engage in while describing spatial relations and computing spatial directions is not cultural then many other practices (e.g. religious ones) are not cultural either. It is not possible to isolate the linguistic from the cultural and claim that culture has nothing to do with spatial thinking. In the argumentation for relativity the use of spatial frames of reference is presented as linguistic practice, language patterns. The cultural variables are presented using labels such as ‘religion’ or ‘literacy’ or ‘Japanese culture’, and not by describing the practices behind the labels. If those ‘cultural variables’ were described in the same terms as e.g. use of spatial frames of reference it would be evident that culture and language are not so easily separated. As for the problem of how a language as a part of a culture helps culture get ‘into the head’, this is no problem once one recognizes the cultural aspect of language.

Here it must be emphasized once again that although a sociocultural perspective leads to another understanding of ‘language’, ‘culture’ and ‘cognition’, it is not a redefinition of these three as ‘variables’ in order to discuss them as standing in an alternative causal relation. It is a question of deciding where the priority lies. Focusing on language in terms of sociocultural practices rather than ‘particular languages’ makes ‘culture’ and ‘cognition’ (or ‘thought’) inseparable from linguistic practice.
In the discussions about linguistic relativity there is also the question of the direction of influence. Some (e.g. Everett 2005) disagree with the neo-Whorfians mainly about the direction of causality, not about linguistic and cultural diversity. In the following section this issue will be addressed.

**Direction of causality**

The criticism against the neo-Whorfian studies are often based on notions of universality regarding human thinking, and especially spatial thinking. However, as shown in Section 4.2, Everett (2005) discusses the influence of culture on language and cognition. Like Levinson, and Lucy and Gaskins, he makes a linguistic analysis, but in his case, language is claimed to be shaped by culture. The cultural factor is here defined as a particular constraint, namely, the principle of immediacy of experience. Everett’s argument differs from neo-Whorfian arguments as regards causal direction, but not regarding the view of culture, cognition and language as being three variables. The direction of causality from language to thought has also been questioned by Li and Gleitman (2002) who suggest that the results of the spatial language studies (e.g. Pederson et al. 1998) may be interpreted differently. It may be ‘habitual linguistic practice’ in the communities that ‘determines the relevant modes of thought’, or it may be that ‘cultural differences in modes of thought render certain linguistic usages handier than others’ thereby influencing their prominence and frequency of use. This objection to interpreting the results in a neo-Whorfian way illustrates the difficulty of ‘proving’ the direction of causality. However, most of all it illustrates the difficulty of discriminating between the variables ‘language’, ‘thought’, and ‘culture’. For instance, does cultural difference in modes of thought belong to ‘cognition’ or to ‘culture’? Is habitual linguistic practice ‘language’ or ‘culture’? There are thus at least two aspects to the question of causal direction.

First, there is the question of which is the ‘right’ direction, assuming that ‘language’, ‘thought’ and ‘culture’ are separate variables. Determining the right direction entails evaluating the arguments for the influence of linguistic structure on thinking, and the arguments for the influence of culture on linguistic structures (and possibly on thinking). In the neo-Whorfian studies, the different conclusions as to what is the ‘right’ causal direction seem to follow from different points of departure rather than hard evidence.

Levinson, along with Lucy and Gaskins, and Bowerman and Choi, are primarily interested in challenging claims of universal cognition. They have found semantic diversity and remarkable behavioural differences as regards e.g. spatial thinking between people living in different communities. Linguistic (semantic) diversity is investigated as a possible explanation of cognitive diversity. Levinson’s argument for causality leading from language to thought was described in Sections 3.4.4 and 5.1.3.
Everett on the other hand, is interested in the make-up of languages. He questions the universal design features proposed by e.g. Hockett. He has found ‘gaps’ in the Pirahã language which he explains by reference to a cultural constraint. He is assuming causality leading from culture to language on the grounds that there is no linguistic or cognitive commonality between the gaps, but that they do share a cultural value – the value of referring only to immediate experience.

Second, one can question the assumption of separate variables. As pointed out above, the arguments concerning causal direction reveal the difficulty of separating language, cognition and culture, which suggests that this second aspect is more important. The problem arises from the assumption of a causal relationship which requires treating ‘culture’, ‘language’ and ‘thought’ as separate variables and determining the ‘right’ causal direction. Unless one is attracted by the idea of explaining aspects of culture, cognition and language in terms of causality, there is no need for separate variables. As pointed out in previous sections, an alternative non-grammatical view of language does not make this separation.

For example, the Tenejapan way of life, to a certain extent, involves using the slope of the land as a tool for spatial description. The UP/DOWN vocabulary reflects this fact. In the specific situations when Tenejapan people use the uphill/downhill vocabulary (in a meaningful way) they are engaged in a cultural practice. Referring to or describing spatial relations also involves spatial reckoning. It is part of the practice to be able to locate yourself in relation to the uphill and downhill of the slope. The fact that Tenejapans engage in this type of activity is the important fact. There is no way to isolate culture or language from the specific kind of reckoning that the Tenejapans must do and argue that one causes the other. Together they constitute a practice.

An ‘explanation’ of why the Tenejapans think the way they do could be historical and be framed in terms of ‘evolution of culture’ rather than a Whorfian effect. However, evolutionary questions are generally not asked. The neo-Whorfian perspective is mainly ahistoric in that the basic research question is whether, on an individual level, a causal effect of language on thought can be empirically established.26

Until now I have argued that effects of language on thought cannot be claimed unless language, thought and culture are defined as three separate

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26 In Levinson (2003) there is a discussion about the evolution of three main types of frame of reference in terms of ‘co-evolution’. However, this is a discussion about the evolution of particular languages rather than cultural practices. As Levinson explains, ‘A specific language consists of (or draws on) ancient cultural traditions transmitted and modified over generations, in response to the cultural, ecological and communicative needs of its many users. Choices about which frames of reference are systematically coded, and exactly how each is conceived, are fixed in the lexicon and grammar of the linguistic system’. Thus, frames of reference are ‘bio-cultural hybrids, just as is language itself’ (p. 324).
variables. Hill and Mannheim (1992) criticize this separation, and yet they claim that there are Whorfian effects of e.g. the English personal pronoun system. This calls for comment.

**Other Whorfian approaches**

Hill and Mannheim criticize the way Whorf has been interpreted. They claim that it is wrong to suppose that Whorf ever discussed a hypothesis concerning three separate variables. On the other hand, they claim that it is possible to make a more restricted interpretation of the Boasian tradition. According to this interpretation, grammatical categories play ‘a key role in structuring cognitive categories […] by constraining the ontology that is taken for granted by speakers’ (Hill and Mannheim 1992: 387).

At the same time that Hill and Mannheim propose that language influences thought, they deny the possibility of separating language from non-language. As pointed out, Hill and Mannheim interpret Whorf in a different way than the neo-Whorfian studies. There is no hypothesis of a causal relationship between variables, but still, the view of grammatical categories as the ‘sedimented outcome of long histories of interaction’ implies that there are (more or less) fixed structures in language.

Although Hill and Mannheim describe grammatical categories as results of interaction, they focus on the ‘sedimented outcome’ of these interactions, and not on the interaction itself. In this way, they move away from the real contexts in which language is used, and language becomes an abstraction of the same kind that is represented in the neo-Whorfian literature. The meaning of grammatical categories of a language is taken to exist prior to language use. The role of context for meaning is, if not ignored, at least diminished. This focus on grammatical particulars of a language with already established meanings forces a distinction between language and non-language.

To summarize, Section 5.2 has dealt with the distinction between language and non-language. ‘Culture’ and ‘thinking’ as non-linguistic variables have been discussed. I have argued that from the view of language exemplified in Section 5.1.1, talking and thinking about e.g. space is not only a linguistic but also a cultural practice that involves rather than induces a certain kind of thinking. The hypothesis of a causal relation rests on the assumption that language, thought, and culture are separate variables, a view which is difficult to maintain if integrated sociocultural practice is considered primary to linguistic structure or cognitive patterns.

The notion of linguistic relativity does not only presuppose distinct variables, it also needs a mechanism for the influence of language on thought. From a relativist point of view, learning a particular language affects conceptual development. In the next section, language acquisition and conceptual development will be addressed.
5.3 Language acquisition and conceptual development

An investigation of the linguistic relativity hypothesis would not be complete without a discussion of language acquisition. Several neo-Whorfian studies take a developmental perspective, and look for evidence for linguistic relativity in language acquisition data. The present section discusses how language learning and conceptual development are treated in the neo-Whorfian case studies.

In neo-Whorfian literature on the spatial domain the debate is centered on whether the spatial frames of reference are given from the start as natural concepts or constructed during language learning. In e.g. Levinson (1996; 2001; 2003) and Brown (2001) the findings about semantic differences in the spatial domain are viewed as evidence against proposals that frames of reference are innate (e.g. Li and Gleitman). Similarly, data from language acquisition are used to argue for the stance that frames of reference are not universal and not innate.

Levinson (2003: 307) argues that if humans are endowed with a stock of innate concepts, one might expect to be able to distinguish between ‘natural’ categories and constructed ones by looking at the course of development over time. The properties of spatial frames of reference are compared to the criteria for natural categories suggested by Landau and Gleitman (1985) who claim that natural categories should display four properties.

- They should be learned early in development, before the age of three.
- In the course of learning, one should not be able to detect attempts to construe the relevant terms in other, but related, ways.
- They should be universally coded in the ‘core vocabulary’ in all languages.
- They should be learnable even under poor input conditions, as when the child has perceptual deficits.

By these criteria none of the spatial frames of references are natural concepts. According to Levinson (2003: 308) the following is true about frames of reference:

- In European languages, the intrinsic frame of reference is learned first, but notions as intrinsic ‘in front of’ and ‘left/right’ are not mastered in production until after the age of three. Also relative ‘front’/‘back’ is learned after the age of three, and relative ‘left’/‘right’ as late as age eleven.
- Children attempt to construe the notions in order to construct the adult pattern.
• All frames of reference are not coded in every language.
• Notions such as ‘left’ and ‘right’ require extensive training.

From a Piagetan point of view, in which it is held that ‘the child in a natural maturational sequence comes to construct increasingly complex spatial concepts through experience in the world’ (Levinson 2003: 308), one would not expect the Tzeltal children to master the absolute system the way they do. The explanation for their early mastery lies in the facilitative effect of language on cognition, according to Levinson.

It is clear to children that the absolute system is important in adult production, as shown by really early use of the terminology. Children then work hard to crack the code. (Levinson 2003: 311)

Exactly how it is done, we do not know but there are clues to the acquisition of absolute vocabulary.

First, there is perceptual support. For example, where a child lives in a compound on a local slope, the ‘up’/’down’ meanings of the terms may have direct perceptual reinforcement (recollect that the terms can be switched to the anchorage of the local slope). Secondly, the ‘input’ language allows a close correlation of local places – houses in compounds, fields around houses, relations to other compounds – with directional expressions. From this, more abstract directional meanings can slowly be induced. Thirdly, many aspects of culture and behaviour are consonant with this absolute interpretation of the terms, and give important non-linguistic clues to how the terms are to be interpreted. (Levinson 2003: 311–12)

According to this reasoning, linguistic form (the code) is primary. There are however non-linguistic clues that help the acquisition since many aspects of culture and behaviour are consonant with the interpretation of the terms. That is, culture helps, from outside of language, the child to crack the code.

Brown (2001) relates the acquisition of the UP/DOWN vocabulary in Tzeltal to controversial issues in language acquisition literature such as the strategies children adopt for learning words, the possible biases they begin with and the function of universal semantic features like ‘vertical’. By showing that Tzeltal children’s acquisition of the UP/DOWN vocabulary does not fit in with suggested universal strategies and biases, she argues that the process of language acquisition, and thereby conceptual development, is dependent on specific language structures. In this way, findings about how Tzeltal children acquire language are used as arguments against universalism and in favour of relativity. According to Brown, until recently it was widely held that there is a universally given set of pre-linguistic natural concepts that guide the children’s early hypotheses about the meanings of spatial words. Many theorists have claimed that preconceptions about semantic content are necessary to begin the word-learning task. Another related debate concerns
the nature of children’s early hypotheses about word meaning. What kind of bias, if any, do they start with? For the learning of concrete nouns, many biases have been suggested as solutions to Quine’s problem of the indeterminacy of reference. This approach has also been extended to verb learning, and one suggestion is that children have a strategy of starting with simpler, more general verb meanings and gradually learning more specific meanings by adding restricting features (Clark referred in Brown 2001: 513).

Problems with these hypotheses have led other scholars to focus on the role of context, interaction and communicative intent, and to reject the idea of word-learning biases, Brown (2001: 513) explains, referring to Tomasello, and Tomasello and Merriam.

According to Brown, evidence from cross-linguistic studies of children’s early language-specific spatial meanings in recent years shows the necessity of rethinking these theories of how children approach the word learning task. The proposed biases and universal concepts do not fit in with the findings of how Tzeltal children acquire the semantics of the UP/DOWN vocabulary. Instead, Brown proposes that the ‘highly specific nature of Tzeltal verbs influences the children’s hypotheses about what kinds of meanings verbs can have’ (Brown 2001: 514). This suggests ‘a language-specific bias towards verb specificity, induced on the basis of verbs they have already learned’ (Brown 2001: 514).

Acquiring the Tzeltal spatial vocabulary means learning to maintain absolute orientation at all times – to know where ‘uphill’ (south) and ‘downhill’ (north) are even at night and in unfamiliar places. In addition, the spatial vocabulary of Tzeltal can have different meanings in different contexts. Since the vertical axis in Tzeltal semantics is confounded with the Absolute system of spatial reference, when people say the Tzeltal equivalent of ‘Go up’ or ‘It’s descending’ or ‘X is uphillwards of Y’ they can mean either vertically or horizontally along a coordinate abstracted from the lay of the land, roughly South/North. To make things even more difficult, there is a third source of ambiguity: the UP/DOWN axis may also be abstracted from the local slope of land even when it deviates from a South/North direction. (Brown 2001: 516–17)

Learning spatial language, Brown argues, involves two tasks: ‘learning the relational categories and the language’s labels for them, and learning the frames of reference for calculating spatial relations employed in the language community’ (Brown 2001: 517). The child must learn this from utterances in different contexts. He or she hears motion verbs in contexts like “Descend!” (from a tree, a bed, the uphillwards [i.e. southwards] house, etc.), “He ascended” (into the bus, to the uphillwards (southern) fields, etc.) “She descended from San Cristobal,” “The rain is descending” [i.e. coming from the south]’ (Brown 2001: 517). From these kinds of utterances in their specific contexts, the child must abstract ‘a sense of “up/down” which can
apply equally to spatial relations which are vertical or which are arrayed along the axis corresponding to the slope of the land, whether or not the objects being talked about are on a slope or on the horizontal’ (Brown 2001: 517). The mechanism by which the language specific bias comes to affect Tzeltal children’s hypotheses about what verbs can mean could be an associative mechanism, Brown suggests, which means that children compare the use of a specific word in different contexts and create hypotheses about the meaning of the word from selective associations.

For the acquisition of the Tzeltal Absolute vocabulary, Brown concludes, there is no evidence of pre-linguistic natural concepts like ‘vertical’. Instead, ‘learning the words in context provides the concepts, by a process of induction across instances of use, instances which include both vertical contexts and landslope contexts for the same words’ (Brown 2001: 536).

In Bowerman and Choi (2001 and 2003) comparisons are made between learners of English and learners of Korean, in order to reveal language-specific patterns of semantic organization. According to Bowerman and Choi, establishing where children’s early meanings come from is important to the debate about Whorfian effects, because it provides clues to ‘how flexible – hence how potentially malleable – children’s cognitive structuring of their physical and social world is’ (Bowerman and Choi 2003: 387). If the concepts children bring to the language acquisition task ‘are so salient and prepotent that language is simply moulded around them’, influence of language on non-linguistic cognition seems less likely. If children easily acquire the ‘structuring of meaning displayed in the input language’, this would suggest a ‘receptivity to patterns of conceptual organization introduced from outside’ that would make Whorfian effects more plausible.

When comparing the two groups of language learners they found language-specific principles of organization from an early age (see Chapter 3). From the youngest age group on up, the children grouped and distinguished the actions significantly more like adult speakers of their own language than like same-age children learning the two other languages, which would suggest that children’s concepts are not universal but (at least to some extent) shaped by linguistic input. To the extent that Bowerman and Choi argue in favour of Whorfian effects of language on cognition, this is an argument against universalism. Concepts are not innate, but must be constructed by the child on the basis of exposure to language. That is, they adapt to structures of meaning displayed in the input language.

For the learning mechanism Bowerman and Choi (2003) suggest structure-mapping. Structure-mapping theory, ‘which focuses on the acquisition of relational concepts by learners of any age, posits that relational abstractions can emerge in the course of comparing exemplars’ (Bowerman and Choi 2003: 407). This means that, in acquiring language-specific spatial categories children compare the properties of different specific spatial situations and gradually learn to use the right spatial word in different situations.
Some of these properties may take an abstract form and be applicable to many different situations, like for example *containment*. Other properties may be hidden within the contexts in which they occur. For example, attaching one Lego piece to another might be seen as different from attaching a cap to a pen, and infants may be slow to recognize the potential similarities between situations unless they are prompted to do so. In cases like this, Bowerman and Choi argue, an important stimulant to comparison can be hearing the same word.

As the child encounters successive uses of the word, she ‘tries’ (although this process is presumably rarely if ever conscious) to align the referent situations and work out what they have in common. Sometimes she may already have a suitable concept in her cognitive tool kit, but may simply not have noticed that it is applicable to some of the situations. Other times there is no existing concept that does the job, and the child has to construct a new one to account for the distribution of the word. (Bowerman and Choi 2003: 417)

Children thus construct semantic categories ‘on the basis of the way they hear words used in the input [...] Language input helps the learner decide which kinds of similarities and differences among referent situations are important for purposes of selecting a word’ (Bowerman and Choi 2001: 497). This view of the learning process may be placed within the frame-work of *usage-based* approaches to language. As Bowerman and Choi explain, these approaches ‘stress the dynamic properties of linguistic knowledge – i.e. the critical role played by input factors like type and token frequency and competition among forms in the input’ (Bowerman and Choi 2001: 498).

From these accounts of language acquisition a few observations may be made.

1. The neo-Whorfian arguments are primarily directed against universalist accounts of language acquisition and conceptual development. It has been held that e.g. spatial concepts are universally given and that cognitive development in the spatial domain provides the basis for language development. However, data from learners of Tzeltal, Guugu Yimithirr, English and Dutch show that neither language development nor conceptual development are the same for speakers of different languages. This, it is argued, suggests the possibility that concepts are not universal or develop according to universal rules, but are actually induced by language. However, as noted in Chapter 3, neither Levinson nor Lucy rule out the possibility of universality at some level.

2. The core of the argument in all the case studies is that linguistic input – exposure to a language – spurs the child to seek the meaning of linguistic forms. The role of *linguistic* input is emphasized, which implies that, in a situation in which a child is confronted with e.g. spatial language,
words are primary, and other features of the situation are secondary. When the child encounters a word and becomes aware of its importance, he or she tries to figure out its meaning, to ‘crack the code’. When ‘the same word’ is encountered in different contexts, learners are prompted to compare situations in order to learn the meaning of the word. Sometimes there is a suitable concept in the cognitive tool kit, but at other times the child has to construct a new concept to account for the distribution of a word (Bowerman and Choi 2003: 41). Thus, the word and the meaning already associated with it become the most important features of the learning situation, not the actual practice in which the words are used. There are ‘clues’ to the meaning of words, since many aspects of culture and behaviour are consonant with the meaning of terms (Levinson 2003). Thus, culture and behaviour help the child, but from outside of language, to crack the code, since the code is segregated from culture and behaviour. Linguistic meaning is given in advance by the code. Since the neo-Whorfian studies to a large extent are meant to question ideas of innate concepts and conceptual development, they emphasize that children do learn the meaning of words and construct their concepts as they hear language in different contexts in their lives. However, meaning is not dependent on context in the more radical sense that every context is new and meaning is constantly negotiated. Meaning is only to a limited extent dependent on context, as in the case of the UP/DOWN vocabulary which may refer to the direction of a local slope, the general land slope, or to the vertical axis, depending on context.

3. The child is described as an observer – struggling to crack the code by comparing different situations – not as a participant in (linguistic) activities with an urge to interact.

In the terms of Segerdahl, Fields and Savage-Rumbaugh (2005), or Taylor and Shanker (2003), we might say that the neo-Whorfians answer the WHAT question in the same way. Whether they are concerned with grammar or vocabulary, the child is described as faced with the task of acquiring established meanings or structures of meaning displayed in their particular languages. HOW the child acquires the linguistic structures is explained in terms of a process of induction across instances of use, in which the child compares the properties of different specific situations to see what motivates the use of a word, and gradually learns to use it right. Now, in any account of language acquisition one must explain the fact that children do learn to use the right words. The point here is not to question that children learn to use the right words, but that alternative views of language provide alternative accounts of how children learn. From a cultural perspective on language, as a ‘temporally situated, ongoing process – the process of making and re-making signs in contextualized episodes of communicative behaviour’ (Jo-
seph, Love and Taylor 2001: 212), learning language is not a process of acquiring established meanings, because there are no such meanings. Learning the primal language (Segerdahl et al. 2005) or learning to speak, means enculturation, learning what to do with words. In learning language, the child has to participate in activities in which words are used, because there is no other way to learn language (cf. the case of the chimpanzee Nim), and participating and interacting is normal for children. The words that are used in these activities are not important in themselves. They can be exchanged by gestures or other media because their meaning lies in the way they function in the activities. Such a cultural perspective clashes with the neo-Whorfian accounts of language learning in the following ways:

1. A sociocultural perspective on language focuses on practice and is not compatible with the emphasis on linguistic input in terms of vocabulary and grammar, as opposed to ‘context’.

2. The view of language acquisition as a process of enculturation, and the emphasis on the importance of participation in reflexive interaction is not compatible with the view of the child as an observer who is ‘cracking the code’, by matching the right word (meaning) with the right context.

The sociocultural perspective also clashes with the universalist claims of innate biases for language learning. However, the case of homesigns (see Section 4.1.) is an interesting contrast to the neo-Whorfian stance. Although it is presented as evidence for innate biases, it might be interpreted from a sociocultural perspective as an argument that the foundations of language are found in sociocultural practice, in interaction and communication.

Now, if the neo-Whorfian views of language acquisition are rejected, how do we account for the fact that conceptual development seems to differ across cultures and to be consistent with language patterns? The neo-Whorfians take the conceptual development to be connected to the acquisition of established forms and meaning. Another way to express the relation is to treat conceptual development as connected to the cultural practice of learning to act, of using language. From this point of view, learning to participate in various activities drives conceptual development. In other words, concepts need not be innate or determined by features of a language; they may be driven by sociocultural practice.

To summarize Section 5.3, language acquisition in the relativity studies is discussed in terms of biases and strategies employed by the learner to grasp the meaning of an expression, and the role of linguistic input is emphasized. Linguistic forms are given a primary status in relation to ‘the context’, that is, everything else in the particular situation in which the form is uttered. The
words have meaning before they are uttered, and in order to learn the meaning the child compares utterances across contexts.

In the following section a summary of all the arguments in Chapter 5 is provided and the question of whether people think differently because they speak different languages is once again addressed.

5.4 Do people think differently because they speak different languages?

The overriding question of the present thesis is whether human beings in different communities develop concepts and skills that are not shared by members of other communities because they speak different languages. Do speakers of Guugu Yimithirr and Tzeltal use absolute frames of reference when talking and thinking about spatial relations just because their languages make them available? Do speakers of Yucatec Maya attend to the material of an object rather than its shape because of grammatical number marking patterns? There are a number of case studies presenting empirical data (see Chapters 3 and 4) for or against the hypothesis that language influences thought.

Criticism of the neo-Whorfian studies is often based on claims of universality concerning human cognition, and therefore questions the validity of the empirical data on linguistic and behavioural diversity. However, in the present study a different kind of critique is offered. It is not meant to deny the empirical findings on cultural and behavioural diversity in the neo-Whorfian studies, but to question neo-Whorfian claims by examining the underlying assumptions about language, thought and culture. It is thus not the same kind of critique as that of e.g. Li and Gleitman (2002).

As I have attempted to show in the sections of Chapter 5, the claim of a causal relation between language and thought presupposes a view of language as a stable system or code. The neo-Whorfian studies investigate the role of linguistic diversity in the language-and-thought relation, and language is thus explored primarily as ‘particular languages’, such as English, Tzeltal, Dutch, or Yucatec Maya. The particular languages are viewed as demarcated, cognitively represented systems, in which linguistic meaning is inherent. That is, linguistic meaning is given by the system, prior to any particular situation of language use. The term ‘language’, that sometimes comes into the discussion about relativity as opposed to ‘languages’, seems to refer

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27 I do not exclude the possibility that some of the data may be rightly questioned. However, in the present thesis I am investigating the hypothesis that language affects thought under the premise that both linguistic and non-linguistic experimental data are valid.
to general aspects of having ‘a language’, a code. When communication is mentioned, this too seems to be a general aspect of using ‘a language’.

This view of languages and the focus on particular languages as primary objects of study prompt the view of ‘thought’, ‘language’ and ‘culture’ as separate, and are thus the basic assumptions on which the neo-Whorfian hypotheses rest. However, at least the following problems are connected to this approach to language:

1. The notion of a particular language or ‘second language’ is quite legitimate in many circumstances. Models and idealizations of language are necessary in much linguistic work, and the usefulness of grammars, dictionaries etc. is indisputable. However, for the particular purpose of the neo-Whorfian studies, which is to investigate real relations between languages and thought, focusing on particular languages as primary is problematic, because secondary representations are confounded with the primary sociocultural practices. The static view of language as a system of established meanings cannot account for the fact that linguistic meaning varies between situations and changes over time.28

2. A view of language as a system of meanings-bearing units makes the process of communication seem like a ‘telementational’ process in which linguistic form is primary and ‘the context’ (what actually happens in the situation) is secondary.

3. Language learning becomes a process of acquiring a particular language, or code. The child is seen as primarily trying to grasp the meanings of words by way of induction, not as interacting and communicating.

4. The notion of particular languages as real entities and the emphasis on them as the primary objects of study reduces the notion of ‘language’ in a broader sense to some general aspect of having a code. Language is thereby effectively separated from cultural practice.

From the sociocultural perspective, the distinction between ‘language’ and ‘languages’ takes on a different meaning. The reviews in Section 5.1.1 display approaches to language which are fundamentally different from the neo-Whorfian approach to language. In their perspective, language, or the primal language, is an integrated process of communication. The foundations of language are found in the sociocultural practices we as humans engage in. Therefore, to learn about language one must study the actual situations in which we use language, and not the second-order constructs we call languages. Linguistic meaning is not given by a code but is constantly negoti-
ated in ongoing communication. The notion of ‘languages’ need not be dismissed, but they do not have an existence independent of the situations in which language is used. They can only be defined by reference to such situations. What it means to speak ‘a language’ then, is not described exhaustively by describing the grammar and lexicon of that language. From this perspective, to separate e.g. spatial vocabulary from spatial cognition and from culture is impossible. Further, acquiring a ‘spatial vocabulary’ is not just learning a set of linguistic forms and their associated meanings. Children are not merely observers, struggling to crack the code, but communicative beings who participate in everyday activities and who interact with others. This process of ‘enculturation’ drives both conceptual and linguistic development and they can not be separated. For instance, in Tzeltal, the slope of the mountain is used as a tool for spatial description. Learning to use the land slope is an aspect of learning to speak in this community: not because a part of the Tzeltal vocabulary requires this learning, but because it is part of the Tzeltal ways of life to use the mountain slope when communicating about space. The way people in this community think and speak about space is primary to the notion of particular forms of expression. There is no vocabulary that can force them to behave in certain ways. The words of the UP/DOWN vocabulary are only uttered – if they are uttered in a meaningful way – within certain practices and these practices are not primarily linguistic in the grammatical/lexical sense of ‘language’.

This sociocultural perspective on language is compatible with the empirical evidence of linguistic and cognitive diversity displayed in the neo-Whorfian studies. It allows for the view that languages and cultures differ significantly in a way that universalist critics like to deny. It accounts for the relation (or correlation) between e.g. the UP/DOWN vocabulary and the speakers’ ability to use the uphill/downhill axis in spatial description and orientation. The response in non-verbal tasks may be a consequence of learning to participate in certain activities rather than acquiring semantic structures. That is, the experimental outcome could be interpreted as an effect of sociocultural practice on cognition, although this ‘cognition’ cannot be separated from the practice. In that case, there is nothing mysterious or spectacular about the fact that the subjects respond the way they do, even though they do not speak or listen to speech, because specific linguistic forms were not the most important factor in the development of e.g. spatial thinking. Conceptual development does not have to be either innate or dependent on grammar/lexicon. It may be driven by what you learn to do in life (with or without a specific vocabulary) and in this process, communication and interaction are crucial.29 That is, it may be driven by language in a broader, cultural sense.

29 In sociocultural learning theory interaction is considered crucial to learning (e.g. Vygotsky 1962 and 1978; Wertsch 1991).
To finally return to the question of whether people think differently because they speak different languages, the conclusion of the present thesis is:

If ‘speaking different languages’ is interpreted as having learnt to *speak* in different cultural environments with all that this entails, then the answer may be yes. However, this conclusion has very little in common with the neo-Whorfian claim that spatial language or classificatory preference is *caused* by grammar or lexicon.
6 Summary and concluding remarks

As it has done for many years, the idea of linguistic relativity still attracts interest from both scholars and laymen. Although the idea that language influences thought did not gain much support in the 1960s and the following decades – a period in which universality and innateness rather than diversity were emphasized – the early 1990s brought a revival of interest in the possibility of such an influence. In the past few decades a growing body of literature on the relation between language and thought has emerged, one part of which presents evidence for semantic diversity across languages. Considering that a widely held view in the cognitive sciences has been that human conceptual structures are universal, especially in the domain of space, the findings of semantic diversity are challenging in themselves. Some scholars have gone a step further and are seriously investigating whether semantic diversity may be the cause of cognitive and behavioural differences between speakers of different languages, and their findings have been the focus of the present thesis. The neo-Whorfian studies (reviewed in Chapter 3) investigate the hypothesis that portions of the grammar or lexicon of a language influence speakers’ non-linguistic thinking.

The claim that language influences thought has been debated from a variety of perspectives (see Chapter 4). The critique offered in the present thesis is not based on the view that conceptual structures are universal or that the neo-Whorfian data are invalid – on the contrary, I am convinced of the great value of such evidence of linguistic and cognitive diversity. Nor do I argue that the direction of causality should be reversed. The purpose of this thesis has been to examine the assumptions about language that allow formulating the relation between language and thought as a hypothesis of a causal relation between separate variables, without rejecting the findings of diversity. Next, a brief summary of the neo-Whorfian findings and claims is given.

Lucy and Gaskins (e.g. 2001 and 2003) compare English and Yucatec Maya with regard to grammatical number marking patterns. They show that many English nouns have distinct plural forms. These typically refer to animate entities and ordinary objects (e.g. candle, candles). Nouns referring to amorphous substances (e.g. sugar or mud) do not have distinct plural forms. In Yucatec, plural forms are not obligatory and are used optionally with a comparatively small number of nouns. Further, the two languages differ in the
way they enumerate nouns. In English, in order to enumerate nouns referring to amorphous substances a unit for counting must be specified by adding a 'classifier' (e.g. one cube of sugar, two cubes of sugar). Nouns referring to discrete objects include a notion of quantificational unit and can be counted by using numerals directly without a classifier (e.g. one candle, two candles). In Yucatec, numerals must *always* be supplemented by a special form, a 'numeral classifier'. According to Lucy and Gaskins, the need for numeral classifiers reflects the fact that all nouns in Yucatec are 'semantically unspecified as to quantificational unit', almost as if they referred to unformed substances. The question is now whether the grammatical patterns may lead speakers to attend to different properties of given objects. Will Yucatec speakers attend to an object's material rather than its shape? And if they do, is this a consequence of the Yucatec pattern of treating objects as substances? In order to find out, Lucy and Gaskins performed classification tests on groups of English and Yucatec speaking informants. The groups were shown triads of naturally occurring familiar objects. In each triad there was one *pivot* object and two *alternate* objects, one of the same shape and one of the same material as the pivot object. For each triad the informants were asked to decide which of the two alternates (material and shape) that was most like the pivot object. For example, when shown a small cardboard box, the informants were asked whether this was more like a small plastic box of the same size and shape, or more like a small piece of cardboard. The prediction was that English speakers would match the pivot object to the box and Yucatec speakers would match it to the cardboard. The prediction was borne out. In most cases Yucatec speakers favoured the material alternates while the English speakers favoured the shape alternates. Speakers of the two languages thus classified the objects differently and in line with the expectations based on the grammatical structures of the two languages. According to Lucy and Gaskins the results of this and additional experiments (see Chapter 3), suggest that the cognitive differences 'stem at least in part from the grammatical patterns'.

Another group of studies (e.g. Levinson 2003; Pederson et al. 1998) concern the use of spatial frames of reference (see Chapter 3). They argue that languages differ significantly as regards frames of reference in a way that has not been known until recently. It has often been held that human spatial conception is universal in important respects, and primarily ego-centric and anthropomorphic in nature. That is, the spatial coordinates we use are determined by the verticality and the back/front of our bodies, with an additional left/right axis. However, the neo-Whorfian studies in this area challenge this picture of human spatial cognition. As they show, there are languages that lack terms corresponding to ‘left’ and ‘right’. One of these is Guugu Yimithirr, spoken in northern Australia. In this language nearly all spatial descriptions involve reference to absolute frames of reference, roughly equivalent to our cardinal directions. This means that in situations where e.g.
English-speakers normally would use the terms ‘left’, ‘right’, ‘behind’ or ‘in front of’, to describe a spatial relation (e.g. ‘George is standing in front of the tree’), Guugu Yimithirr speakers use (approximately) ‘north’, ‘south’, ‘east’ or ‘west’ (e.g. ‘George is standing north of the tree’). Natural spoken interaction and elicited speech show that speakers of Guugu Yimithirr rely almost entirely on this cardinal direction system when they speak.

A similar reliance on absolute frames of reference is found in Tzeltal, spoken in Tenejapa, Mexico. The Tenejapa territory forms an incline from high south to low north. When talking about spatial relations on the horizontal plane the Tzeltal speakers use an ‘uphill’/‘downhill’ coordinate system abstracted from the landscape, in which ‘uphill’ is roughly equivalent to south, and downhill roughly to north. The system is used both for short and long distances.

This means that for speakers of Tzeltal and Guugu Yimithirr to express spatial relations in their languages, they must constantly be aware of their present location in absolute terms. Possible cognitive consequences were examined in various non-linguistic ‘rotation tasks’. Informants were shown a stimulus on a table, then rotated 180 degrees and led to another table, where the response was required. For example, when the stimulus consisted of a set of model animals arranged from north to south on a table, the subjects were turned to the recall table and asked to rearrange the array ‘exactly as it was’. Both Tzeltal and Guugu Yimithirr speakers tended to arrange the toy animals preserving the north-south order, while English or Dutch speaking informants tended to preserve the left-right order. According to Levinson (2003: 168), the results are ‘congruent with the coding built into the semantics of spatial description in the two languages’, which suggests that there is ‘a tight correlation between coding in language and coding in non-linguistic memory and reasoning’.

In another investigation of spatial language, Bowerman and Choi (2001 and 2003) compare spatial words in English and Korean. From their work, it follows that the semantic space covered by ‘put in’ and ‘put on’ in English is partitioned differently in Korean, which instead makes a distinction between ‘loose fit’ and ‘tight fit’. To express the spatial events ‘put ring on finger’ and ‘put piece in puzzle’ in Korean, the same verb ‘kkita’ (interlock, fit tightly) is used. Bowerman and Choi suggest that these patterns may have consequences for how speakers of the two languages attend to spatial relations of that kind.

Chapter 4 of the thesis gave an overview of the debate on the neo-Whorfian work. Criticisms of linguistic relativity claims from a variety of perspectives are presented. For example, Li and Gleitman (2002) question the neo-Whorfian findings from a universalist angle, suggesting that linguistic categories and structures are ‘more-or-less straightforward mappings from a preexisting conceptual space, programmed into our biological nature’. Hu-
mans invent words that label their concepts, which accounts for the fact ‘that
the grammars and lexicons of all languages are broadly similar’. They ques-
tion the causal direction leading from language to thought and suggest that
the outcome of non-verbal testing may be dependent, not on language, but
on a third factor, the presence or absence of landmark information. The
strategy that Li and Gleitman take to investigate this is to keep the ‘language
variable’ constant, that is, they use only English-speaking subjects, and vary
the environment in which the subjects solve spatial tasks.

Everett (2005) too questions the direction of causality from language to
thought, but suggests instead that *culture* may influence language and cogni-
tion. He questions the universal design features of language proposed by
Hockett (1960) and argues that the Pirahã culture has produced ‘gaps’ in the
Pirahã morphosyntax.

Others question the way Whorf has been interpreted. They argue that
Whorf never spoke of a hypothesis between variables, and that the opera-
tionalization of language, thought and culture into three variables is not con-
sistent with Whorf’s original writings (Lee 1994 and 1996; Hill and Mann-
relativity hypothesis’. According to Lee, Whorf was primarily interested in
the kind of thinking that is linguistic in nature. He formulated his ideas as the
‘principle of linguistic relativity’, never as a hypothesis that needed to be
tested. He spoke of relations between language and thought, rather than in-
fluences. According to Lee then, neither the theoretical discussions of
Whorf’s ideas, nor the neo-Whorfian empirical work have been based on
Whorf’s own definitions.

Finally, Greiffenhagen and Sharrock (2007) investigate some basic as-
sumptions underlying linguistic relativity. They focus on a form of relativity
which argues that grammatical differences between languages imply different
conceptions of reality. They argue that linguistic relativity is based on
two mistaken assumptions about language, namely that the basic function of
language is description (that is, language is ‘a tool for naming things in the
world’) and that an ontological theory, or metaphysics, is encoded in every
language. They show that relativity (in the form that they focus on) is not an
empirical but rather a philosophical project. Although I agree with Greiffen-
hagen and Sharrock in their critique of Watson, my focus is on another ver-
sion of the relativity hypothesis, and therefore my arguments against relativ-
ity are slightly different. The neo-Whorfian case studies reviewed in Chapter
3 are explicitly empirical in that they experimentally investigate the hy-
pothesis that language affects thinking and behaviour. That is, the neo-
Whorfian argument is not about the metaphysics encoded in each language.
It is a claim that there exists a causal relation between features of particular
languages (rather than whole languages) and empirically measurable behav-
aviour. Therefore, the critique offered in the present thesis focuses on the op-
eralization of thought, language, and culture as separate variables in the neo-Whorfian empirical project.

As a contrast to the neo-Whorfian view, I have reviewed some alternative approaches to language which emphasize the communicative and interactive aspect of language (section 5.1). In the thesis, these are referred to as sociocultural approaches as opposed to the neo-Whorfian approach to language. I have argued that from a sociocultural perspective, the basic notions and distinctions that are made in the neo-Whorfian literature, such as ‘language’ vs. ‘languages’, and ‘language’ vs. ‘non-language’ take on different meanings. From this perspective, the neo-Whorfian empirical findings need not be questioned, but may be interpreted differently.

From an ‘integrational’ point of view, Harris (1998) emphasizes that unless we understand the process of communication, we will end up with a partial and distorted view of language. Communication ‘is not a secondary purpose that just happens to be served by language’. On the contrary, language cannot be divorced from communication.

Taylor and Shanker (2003) question the way language acquisition theories define what the child learns during the process of language acquisition. In many acquisition theories, learning language is seen as acquiring a grammar, a complex system of units and the combinatorial relations between them. In order to understand language acquisition, Taylor and Shanker argue, we need to rethink what it is that children acquire, and be more concerned with the development of metadiscursive skills, that is, the ability to participate in reflexive interactions.

Segerdahl et al. (2005) approach the ‘language’–‘languages’ distinction as a distinction between primal and second language. Learning the first language, the ‘primal language’, is a process of ‘enculturation’, which, they argue, is something many language researchers have failed to see. Learning the primal language is learning to speak, to act, and not primarily learning the grammar and lexicon of your mother tongue. According to Segerdahl et al., second languages may be described in terms of grammar and vocabulary, but the primal language has other design features (see Section 5.1).

As pointed out earlier, the purpose of this thesis, and especially Chapter 5, is not to question the neo-Whorfian findings of linguistic and behavioural diversity, but to investigate and challenge some assumptions about language that are necessary in order to formulate the linguistic relativity hypothesis. Now, assuming that the linguistic data and the outcome of the non-verbal experiments in all the case studies are valid, what is there to question? For example, it follows from the Guugu Yimithirr case studies that there is a group of people speaking a language that has no terms based on relative frames of reference such as ‘left’ and ‘right’, only terms based on absolute frames of reference corresponding roughly to ‘south’, ‘north’, ‘east’, and
‘west’. Further, they use the absolute frames in their every-day activities, as well as when they solve the non-linguistic tasks, and they never use relative frames of reference. Is it not reasonable to conclude then that their language requires the speakers to develop certain computational skills: a mental map and compass? Someone lacking the cognitive abilities of the Guugu Yimithirr speakers would not be able to express themselves in the Guugu Yimithirr language.

There is a certain appeal to this line of reasoning. The problem lies in the way language is explored primarily as ‘particular languages’, such as English, Guugu Yimithirr or Korean. This focus on secondary representations instead of human sociocultural practices makes language seem separate from culture and cognition.

Neo-Whorfian studies view ‘particular languages’ as real entities. Any broader notion of ‘language’ is conceived of as an aspect of having ‘a language’, a code. I argued in Section 5.1.3 that though the relativistic research question in the studies concerns the possible cognitive consequences of vocabulary or grammatical structure of particular ‘languages’, the terms ‘language’ and ‘languages’ are confounded in the discussion in a way that weakens the arguments for relativity and reveals some confusion as to what really is at issue. Further, and more important, the emphasis on ‘particular languages’ as causes of cognitive differences implies that there is a linguistic variable, separated from non-linguistic thought (and culture). The linguistic variable is described in terms of semantic parameters or structures in the particular languages, which are held to affect non-linguistic thinking. That is, the nature of linguistic meaning is such that semantic parameters belong to the particular languages, and are consequently independent of actual situations of language use. This notion of language as a self-contained system is necessary to the arguments in favour of relativity, and to many of the arguments against it. There can be no influence of ‘a language’ (in terms of semantic parameters) on thought, unless the meanings of words are taken to belong to ‘the language’.

I have argued that from a sociocultural perspective, the distinction between ‘language’ and ‘languages’ takes on a different meaning than it has in the neo-Whorfian discussion. A sociocultural approach places emphasis on ‘language’ in a broad sense of practice and communication: that is, on what we do with language rather than on ‘particular languages’ such as English or Tzeltal. Speaking a language is not primarily about being able to produce the correct grammatical forms of a particular language but participating in practices. From this perspective the particular languages are not the primary objects of study as they are in the neo-Whorfian literature, but merely models or idealizations of verbal aspects of linguistic practice. While the notion of particular languages is legitimate in many circumstances, it has no explanatory value with regard to cognitive diversity: as descriptions or models of verbal aspects of language use, they cannot serve as explanations for why
speakers of different languages think or act differently. From a sociocultural perspective, the fact that the Guugu Yimithirr and Tzeltal people use absolute and not relative frames of reference can be viewed as a primary fact, and not a consequence of linguistic categories. The way these groups of people talk and think about space is better understood in terms of a kind of practice that may (or may not) involve the use of certain verbal linguistic forms. The important aspect is not what words they use but what they do with the words.

The way ‘particular languages’ are examined in the neo-Whorfian literature relates to the distinction between language and non-language. In the neo-Whorfian literature ‘language’ and ‘non-linguistic cognition’ are examined separately. There is also ‘culture’, however, a variable that is considered and dismissed as a possible third factor that may explain the outcome of the non-linguistic experiments. In Section 5.2, I discuss the characteristics of these variables and whether it is possible to distinguish between them.

Cognition is investigated in non-linguistic tasks, specially designed to capture the non-linguistic thinking that is supposed to support the use of e.g. absolute or relative frames of reference. The outcome of the non-linguistic tasks suggests that there is a ‘correlation’ between features of ‘a language’ and ‘non-linguistic thought’ (or ‘cognitive style’). I have argued that the kind of thinking that is measured in the experiments is ‘non-linguistic’ only in the fixed-code sense of language. Further, the neo-Whorfian view of cognition is static, which follows from the static view of language. The patterns of thought are described as laid down by the patterns of language, regardless of what activities a person is engaged in. That is, both the ‘cognition’ and the ‘language’ variables are studied without reference to real-life situations. From a sociocultural point of view, the correlation between language and non-linguistic thinking may be interpreted differently. It could be argued that the outcome of the non-linguistic tests reflects what the subjects have learned to do, rather than what particular language they have learned, because the specific kind of thinking belongs to practices. The tasks of the tests may be sufficiently similar to familiar practices to evoke the same kind of thinking and acting. In this perspective, the so-called non-linguistic thinking (the cognitive style) has to do with language; not in the sense that it is induced by grammar or semantic parameters, however, but in the sense that language is a part of the practices in life where cognitive style develops.

As mentioned above, other possible factors such as literacy, religion, or the ‘Japanese culture’ vs. ‘Yucatec culture’ are considered and rejected as possible explanations of the outcome of non-linguistic tests. According to Levinson (2003), pair-wise comparisons between groups of people who share many aspects of ecological environment and cultural tradition but differ as regards ‘the critical linguistic feature’ (spatial frame of reference), suggest that ecological factors, material culture, religion or other cultural variables ‘do not seem to have a decisive role to play in non-verbal coding’.
According to Lucy and Gaskins (2003), the evidence for ‘the primacy of language’ rather than culture is reinforced by evidence from other languages. The Japanese and Yucatec languages are similar in that they rarely mark plurals and obligatorily use classifiers in count constructions, but they are ‘associated with markedly different cultures’. Despite this, speakers of the two languages show similar classification patterns in non-linguistic experiments.

Apparently, the way the people of a community typically talk about spatial relations, or classify objects, is characterized as a property of their language, not of their culture, whereas religion or literacy are characterized as culture. Against this, I have argued that the distinction between linguistic and cultural practice is problematic. For example, ‘religion’ (or religious practice) as well as other ‘cultural variables’ probably involve language and the use of specific terms in the same way that spatial description and computation involve language. To call them cultural factors (as opposed to the linguistic factor) is to disregard their linguistic dimension.

Section 5.3 discusses neo-Whorfian views on language acquisition. The arguments in the neo-Whorfian literature are primarily directed against universalist accounts of language acquisition and conceptual development. Data from learners of Tzeltal, Guugu Yimithirr, English and Dutch show that neither language development nor conceptual development are the same between speakers of different languages, which suggests the possibility that concepts are not universal or develop according to universal rules, but are actually induced by language.

The role of linguistic input is emphasized, which implies that, in a situation in which a child is confronted with e.g. spatial language, words are primary and other features secondary in the situation. When ‘the same word’ is encountered in different contexts, learners are prompted to compare situations in order to learn the meaning of the word. Thus, the word and the meaning already associated with it becomes the most important feature of the learning situation, not the actual practice in which the word is used.

From the neo-Whorfian perspective, language acquisition is primarily a process of acquiring an object (called e.g. Guugu Yimithirr), not a process of enculturation where speaking-thinking-acting is acquired as an integrated practice. From the sociocultural perspective, on the other hand, learning a language entails learning to participate in practices rather than ‘cracking the code’. This perspective provides a different approach to the question that I used in Chapter 1 to exemplify the idea behind the linguistic relativity hypothesis: ‘Do English, Mandarin, Russian, and Turkish speakers end up thinking about the world differently simply because they speak different languages?’ (Boroditsky et al. 2003: 61). To make sense of the question one must phrase it: do speakers (of any language) think differently because they learned to speak in different cultural environments? To answer that question
it is necessary to study what learning to speak involves in different cultural environments.

As children grow up in the Guugu Yimithirr or Tzeltal communities they learn to talk about spatial relations using the absolute terms. For example, a person giving someone directions to the nearest town must use the absolute terms, which requires that he know his own location and be able to compute the direction to the town. Is a child learning such a practice primarily learning a way of *speaking*, or a way of *thinking*, or a way of *acting*? Is it the words that are the most important factor, or the spatial reckoning process, or the use of (approximately) cardinal points? From the neo-Whorfian perspective, the practice is primarily linguistic. Mental processes must be active in order to *support* the use of spatial terms. However, from a sociocultural perspective, the child is learning an entire cultural practice of which words and spatial reckoning are integrated parts.

To summarize, the neo-Whorfian stance has many problems connected with it. It is based on treating ‘language’, ‘thought’ and ‘culture’ as separate variables, but in fact it is very difficult to uphold the distinctions between the three. Further, it requires that linguistic meaning be inherent in the linguistic system, which implies that the meaning of words is fixed in advance and independently of the situations in which words are used. Learning a language is seen as a process of learning the meanings of words by way of induction, which reduces the role of the child to that of a passive observer, instead of an interacting, communicating being.

While avoiding the problematic neo-Whorfian assumptions about language, meaning, and language learning, the sociocultural perspective is compatible with the linguistic and empirical findings in the neo-Whorfian studies. It allows for diversity between languages, and also for the fact that speakers of different languages perform differently in the non-linguistic experiments. It is not compatible, however, with the neo-Whorfian claim of a causal relation between language and thought/behaviour, because linguistic diversity is not interpreted in terms of grammar, lexicon or semantic structure as it is in the neo-Whorfian work. From the sociocultural perspective, the relevant diversity is the diversity of sociocultural practice of which both thinking and language are inseparable parts. The apparent ‘correlation’ between semantic categories and non-linguistic thought/behaviour follows from the fact that words and thinking/behaviour *together* constitute sociocultural practice. The diversity which in the neo-Whorfian work is discussed as *linguistic* diversity is really *cultural* diversity.

As for the notion of ‘languages’, the sociocultural view that they do not exist in the neo-Whorfian sense as systems of established meanings does not imply that there are no ‘languages’, or that meaning is random. However, to the extent that words *have* meaning this pertains to the situations in which they are used. Words can be replaced by gestures, or (as in the case of slang)
other words, but the uses, the practices (the way we live), are not so easily changed, and *that* may be why speakers perform the way they do even when they are not speaking or listening to speech. The responses given in performing so-called ‘non-linguistic’ tasks reflect basic sociocultural practices.
References


