Linguistic Relativity,

Mediation and

The Categorization of Motion

Johan Blomberg, 830725-8239
johan.blomberg.997@student.lu.se

Supervisor: Dr. Jordan Zlatev

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1. Introduction

The limits of my language mean the limits of my world.

Ludwig Wittgenstein

Language and Thought are so intricately woven together that they can hardly be separated from one another. Together they create an intangible web of beliefs, attitudes and preferences, i.e. our knowledge of the world, including other human beings and ourselves. The motto to this thesis is often cited as an example of a strong claim for the constitutive role of language with respect to thought.

This essay is a contribution to ongoing research on whether language impinges upon our categorization of reality in general and motion (situations) in particular (e.g. Slobin, 1996; Bohnemeyer, Eisenbeiss and Narahimsan, 2001; Finkbeiner, Nicol, Greth and Nakamura, 2002; Pourcel, 2005; Blomberg, 2006; Zlatev, David and Blomberg, in press). These studies all assume a (neo)Whorfian perspective on the impact of language upon thought, influenced by *the principle of Linguistic Relativity* (Whorf, 1956: 213). As known, Whorf postulated that specific linguistic patterns will inevitably influence thought. This leads to the relativistic conclusion: speakers of different languages will categorize reality differently due to their native tongue.

Within this field there has been a long debate regarding the pervasiveness of such linguistic impact. Due to the lack of convergence on a theoretical level, as well as within (neo)Whorfian studies, it seems preferable to widen the theoretical possibilities beyond the (neo)Whorfian position. This thesis proposes a classification of the different approaches to the language-thought nexus with the most plausible models highlighted.

Across languages we find differences in the linguistic categorizations of motion, which makes motion a suitable field of study for conducting neo-Whorfian experiments. However, the results of such studies vary to a large extent due to methodological and conceptual issues. Therefore, the domain of motion needs to be clarified in order to serve as an appropriate field of study.

The stimuli often used to test a linguistic effect on categorization of motion are either static or dynamic representations of motion segmented in three parts, so-called *triads*. A triad consists of one target part and two options that each differ with respect to the target part in one dimension (e.g. the route, PATH, or the fashion of movement, MANNER). The subject's task is to describe the target part and choose the option perceived to be most similar to the target. The procedure can be in any direction: description prior to choice, or vice versa, while the options can be presented in parallel or serially. Since no coherent picture has so far emerged, the field is still tempting to investigate theoretically as well as empirically.

Blomberg (2006) presented one such study involving 24 speakers of Swedish. The results were not in accordance with the relativistic hypothesis – but still interesting. These results were preliminarily interpreted as an effect of *Semiotic Mediation* (see 2.2. and 4.2.2.). The study was however inconclusive insofar as no comparisons were made between languages. This time, the horizons were broadened by conducting a study on speakers of a "verb-framed" language, French (Talmy, 1991, 2000) and comparing these with the results for Swedish, usually described as a "satellite-framed" language (see chapter 3). The same stimuli, a modified version of *The Event Triads elicitation tool* (Bohnemeyer et al, 2001) were used as well as a more elaborate conceptual analysis of the domain of motion. In conducting the latter I drew inspiration from a paper written together with Jordan Zlatev and Caroline David (Zlatev, David and Blomberg, in press).

The aim of this thesis is thus threefold: (i) to outline the different theoretical understandings of linguistic influence on thought (ii) to present an applicable taxonomy of motion as a field of study (iii) to test the different theoretical claims as well the taxonomy in an empirical study.

1.1. Structure of the Thesis

Chapter 2 presents a theoretical investigation leading to a classification of theories of the language-thought nexus. From this classification three models postulating linguistic effects on thought will be highlighted and explored throughout the chapter. The primary focus will be on the notion of Semiotic Mediation as proposed to Vygotsky (1978, 1986), followed by a rather brief summary of Linguistic Relativity. As pointed out by Mertz (1985), Whorf and Vygotsky represent two major approaches to the language-thought relation. While Whorf chose a structure-based approach (Lucy 1997) and focused on linguistic differences; Vygotsky focused on mental processes and the fashion in which they are affected, developed and mediated by (the internalization of) language. In addition to these, the fairly recent *thinking-for-speaking* program will be discussed. Presented by Slobin (1996), thinking-for-speaking lies, in a way, in between Linguistic Relativity and Semiotic Mediation (see 2.5.).

Chapter 3 lays out the domain of study, motion, and offers a critique of the conventional analysis of the domain in neo-Whorfian studies. In favor over the traditional analysis, an alternative taxonomy of motion (situations) will be presented, following Zlatev et al (in press). Chapter 4 summarizes prior research in the field of motion-categorization and language influence. Chapter 5 nails down the hypotheses, based on the theoretical discussion in Chapter 2, and further discusses methodological issues. The chapters following, 6 and 7, present and analyze the results from the present study and compare them to those of the prior study (Blomberg, 2006). Chapter 8 ends the thesis with a summary and some concluding remarks.

2. Different Approaches to the Language-Thought Relation

Throughout history we find a vast number of diverse claims postulating linguistic influence upon thought: from Bhartihari (*Vâkyapadîya*) and Augustine (*Confessiones* I:8) to the present day. However, I will suggest that if not all, then at least the majority of these models fit into a classification of four types.[1]

From this classification the most plausible theories will be highlighted and will serve as a basis for the hypotheses presented in 5.3. Since it appears clear that language does in fact influence cognition the question foremost in need of an answer is *how* this impact is characterized. Together with the different and contradictory results of prior studies on the linguistic impact upon the categorization of experience, I propose a theoretically open-minded approach to the relation between language and thought.

2.1. A classification of Language-Thought Theories

Often one distinguishes between "strong" and "weak" versions of linguistic influence where "strong" is stereotyped as implying language to be "a prison to the mind", much like the maze of the Minotaur where not even wings of wax could set you free. The "weak" version merely states that knowledge of an imperceptible entity is impossible without a corresponding term. An example would be the difficulty in grasping the notion of the basic constituent of matter without introducing a term denoting such a concept, i.e. 'quark'.[2] This weak version can be seen as both harmless and pointless since no conclusive implications about the nature of linguistic impact follow. Ironically, these two views can be said to be due to a linguistic influence of the predicates "weak" and "strong" – these imply that the "degree" of linguistic impact can be placed on a continuum, i.e. different kinds of assumed impact differ only in degree along the same dimension.

Instead of being quantitatively diverging, I suggest that various language-over-thought models differ qualitatively in two relevant dimensions. At the same time, they are neither necessarily mutually exclusive nor incommensurable with one another in all respects.

First, models of the linguistic impact on thought can be said to be either *context-dependent* or *context-independent*. The latter would characterize Linguistic Relativity: irrespective of the task, context, situation, etc. language (patterns) influences thought (see 2.3.). A context-dependent influence, on the other hand, alleges the "freedom" of thought and presupposes a less ubiquitous

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1 A similar way of describing the different approaches of linguistic influence can be found in Lucy (1997: 292).
2 The strong version presented is often called *Linguistic Determinism*, attributed amongst others to Wilhelm von Humboldt (1836) and certain interpretations of Ludwig Wittgenstein (1921), while the weak version seems to be presented even by such an adversary to relativity as Steven Pinker (1989: 360).

mode of interaction between thought and language as is the case with the notion of Semiotic Mediation presented by Vygotsky (see 2.2.). This parameter classifies with respect to the impact imposed by language. That is, how and when thought is affected by language.

The other dimension regards the notion of different native tongues leading to differences on a conceptual level. That is, do (as the Whorfian tradition presupposes) differences between languages render differences in thought and categorization? If so, we have a relativistic (or language-specific) theory. If not, we might label it non-relativistic (or language-general), i.e. what is the effect of having a language as opposed to not having one? While the first parameter classifies theories with respect to their perspectives on thought (mental processes and cognition in general), the latter regards the analysis of language: what is language and which qualities of language lead to a linguistic impact?

These two dimensions can be combined binary,[3] thus creating four sets of theories regarding the relation language-thought, with corresponding examples from some of the most prominent advocates for each position:

1. Context-independent / Language-general: *Language creates (the illusion of) conscious mental states* (Dennett, 1991)
2. Context-independent / Language-specific: *Language patterns affect thought* (Whorf, 1956)
3. Context-dependent / Language-general: *Language is used as a psychological tool to mediate thought* (Vygotsky, 1978)
4. Context-dependent / Language-specific: *When in the act of speaking, thought is influenced by language-specific patterns* (Slobin, 1996)

These models within the classification differ qualitatively in their analysis of language and thought; therefore we cannot find a single dimension according to which we can place them on a continuum. In this essay, the claim of language as the creator of consciousness will be left out. Partly because the claim is highly doubtable – if true, infants and animals would merely be automata and partly because the claim cannot be empirically tested with the stimuli employed. The remaining three types of theories are however empirically viable and will serve as a basis for the hypotheses presented in section 5.3. The remaining parts of this chapter attempt to further elucidate these approaches.

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3 Necessarily, this classification might be a bit too broad in the sense that somewhat diverging models belong to the same set, but if classifications are to be made some generalizations are necessary.

2.2. Introducing Vygotsky – A Mediational Approach to Language and Thought

In this section the notion of Semiotic Mediation according to Vygotsky will be surveyed. The entire Vygotskyan school will not be explored; instead, the essence of Semiotic Mediation will be nailed down without too much focus on the socio-cultural impact intimately connected to the works of Vygotsky.

What makes human cognition special for Vygotsky is how mediation enables a shift in cognitive processes. Instead of human agency being governed by functional responses to the world around us, mediation enables processes yielding abstract and logical reasoning, concept formation, and "higher" forms of memory and attention (Vygotsky, 1978). The primary mediational "tool" is according to Vygotsky language. Through ontogeny, we *internalize* language as a social phenomenon and make it "our own". Due to this internalization higher mental processes become available through mediation. That is, language mediates between perception and behavior. We begin by presenting the prerequisites for mediation before moving on to what signifies mediation for Vygotsky.

2.2.1. Internalization

The process of mediation is possible through the internalization of social, external features (ibid: 39): especially language in its various manifestations, e.g. speech, written language and sign language. In early ontogeny, language is at first purely a social phenomenon – the child imitates adult behavior without much understanding of communicative intentions.

> All higher mental functions are internalized social relationships... Their composition, genetic structure, and means of action – in a word, their whole nature – is social. Even when we turn to mental processes, their nature remains quasi-social. In their own sphere, human beings retain the functions of social interaction (Vygotsky, 1981:164).

The core of Vygotsky's theory is that without social interaction typically human cognition would never develop. Therefore, social interaction is the foundation of human agency.

> Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first between people (interpsychological), and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relations between human individuals (Vygotsky 1978:57).

When looking upon language, Vygotsky founded a distinction between *znachenie (*meaning) and *smisl* (sense).[4] Early on in language acquisition we can only use words (and therefore only

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4   This is not to be mistaken for the classical distinction between *Sinn* and *Bedeutung* (Frege, 1985).

understand them) in a contextualized manner (*smisl*). This linguistic "competence" can be seen as a "know how" or functional understanding of language while we later on are able to acquire a more abstract and conceptual (or decontextualized) meaning of words (*znachenie*). That is, our linguistic knowledge has gone from functional to conceptual or from "knowing how" to "knowing that".

Vygotsky supports this distinction by comparing how recently literate people and illiterate people categorize objects (Luria, 1978). It seemed to Vygotsky that the recently literate relied more on abstraction and generalization (i.e. znachenie) whereas the illiterate used the concrete setting when solving the task (i.e. smisl). The analogy between children and illiterate people is of course problematic, though it does not seem that Vygotsky intended this literally. We will return to this distinction in 2.2.3.

As development continues an internalization of social structures occur; instead of turning to the world outside for help, we turn inside ourselves. We use the same methods, the same tools and the same ways to apprehend our goals, but the understanding occurs "in our heads". In other words, we use (internalized) signs to mediate the "higher mental functions" (typical human capacities – voluntary attention, declarative memorory and abstract reasoning). Language has thus transformed into an intra-personal occurrence from its external, inter-personal origin.

> *An operation that initially represents an external activity is reconstructed and begins to occur internally*. Of particular importance to the development of higher mental processes is the transformation of sign-using activity, the history of which are illustrated by the development of practical intelligence, voluntary attention and memory. (Vygotsky. 1978:56)

Please note that Vygotsky uses the term *reconstruct* to avoid falling into (the traps of) behaviorism or something like present-day social constructivism. According to him, "reconstruction" is due to processes of the human mind. Social and environmental factors are not simply replicated or mirrored onto a "tabula rasa". Since the mind has its own features and its own prerequisites the processes of development and internalization will be dependent on inborn capacities and prior mental stages. The fact that we are always in a social context will inevitably shape our way of reasoning, our way to apprehend the surrounding world, and even how we understand ourselves.

> We begin with the basic tenet that we have managed to establish in the analysis of higher mental functions. We saw that this tenet consists of acknowledging the natural foundations for cultural forms of behavior. *Culture created nothing*; it only alters natural data in conformity with human goals (Vygotsky, 1960: 200. Quoted from Wertsch, 1985. My emphasis).

The distinction between meaning and sense is related to language as either an inter- or intra-personal occurrence. Sense is related to the inter-personal dimension where meaning signifies a shift in comprehension from the social, external sphere into our minds, thereby becoming intra-personal. This internalized language (inner speech) is analogous to external speech insofar as inner

speech obeys the same grammatical rules and constructions as external speech.[5]

2.2.2. Mediation – The Semiotic Channelling of Thought

The process of internalizing a socially founded and shared sign system (language) is imperative for mediation, since it enables the necessary cognitive capabilities. From this Vygotsky claims that all higher mental functions (which only human beings are capable of) are due to mediation (Vygotsky, 1978: 35, 40).

> The central fact about our psychology is the fact of mediation (Vygotsky, 1960: 260. From Wertsch, 1985).

This has been summarized by Kozulin (1986: xxv) as follows:

> Vygotsky […] made a principal distinction between "lower," natural mental functions, such as elementary perception, memory, attention, and will, and the "higher," or cultural, functions which are specifically human and appear gradually in a course of radical transformation of the lower functions.

As such, semiotic mediation is due to an external "tool" enabling or shaping human action in general and human thought in particular (Lucy, 1985: 74). By mastering signs, mental functioning is qualitatively changed: instead of developing in accordance with general biological principles, the mental processes become governed by socially shared sign systems. This development will however depend on prior stages in mental development and cannot transcend the natural or biological constraints. It is this change in mental functioning that enables the "higher mental functions", and it is solely through internalization that we can develop them. Vygotsky (1978, 39-40) characterized non-mediated processes contra mediated processes with the figures in Figure 2.1.

Figure 2.1. A non-mediated process (left) contra a mediated process (right). S and R represents *stimuli* and *response*. From Vygotsky (1978: 39-40).

When we do gain "access" to the higher processes we need to use something, just as we utilize a tool to nourish certain needs (Vygotsky, 1978: 48). Whether you are tying a knot to remember something in particular or labeling an object to think and talk about it, you are in the act of

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5   If inner speech is constrained by the same rules as external speech, the *Private Language Argument* (Wittgenstein, 1953: §208; §243-271) does not befall Vygotsky. This argument stresses the impossibility of a language available solely to one being. The basic assumption regards an analysis of language as essentially analogous to games. Games are defined by their rules and criteria for correctness, and so is language. If language could be private, there would be no way to determine whether rules or norms are applied according to some criteria, thus leading to the impossibility of a private language. However, this argument can be applied to other analysis of language as well.

mediating (ibid: 39). The sign becomes the intermediate link between the individual and the world, with the individual as an active part in the process.[6] When in the act of mediation, some kind of externally founded, but internalized sign is used to enable the higher mental functions. It is through this we are lead to hypothesize linguistic influence on thought: the mediation will inevitably be dependent on the meaning of the (primarily linguistic) signs. Therefore, linguistic mediation leads to a linguistic impact on thought.

As mentioned above, a mediated process differs from a non-mediated one insofar as the "route" between perception and behavior becomes indirect, through the mediation of a sign. Therefore, mediation changes cognitive processes. Of course, Figure 2.1 is not an accurate representation of actual cognitive processes, but serves as a simple illustration of mediation.

What the actual differences are between lower and higher mental functions has not been given a thorough explanation. A reasonable interpretation could be that higher mental processes are more complex than lower. At the same time, the higher processes are necessary for solving more demanding task – thus we are inclined to rely on language and signs when performing a task that requires higher mental functioning. Mediation will thus yield something of a semiotic analysis or "parsing" of a given situation and in such a context the information that is expressed linguistically will be emphasized over perceptually salient information.[7]

For Vygotsky, mediation occurs on a level of one particular sign at the time for each mediated process. It becomes obvious that Vygotsky was not schooled in the linguistic sciences and somewhat naively assumed that only singular signs, viz. (lexical) words can mediate. As pointed out by Sapir (1921), the sentence as a whole can serve as the basis for analysis in favor over the word. It is from a linguistic point of view insufficient to focus on singular, lexical meaning. Furthermore, all kinds of logical reasoning are dependent upon relations between term variables, not the actual content of the variables. If any mode of reasoning is mediated through some sort of sign system, it is definitely logical reasoning. The problem of singular signs could be overcome by postulating complex signs consisting of singular signs, such as *R(x,y)*. The meaning of such a relation is however not due to a lexicalized meaning of the sign as a whole, but rather understood through an analysis of the relation as such.

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6 One might wonder what Vygotsky's comprehension of "sign" is. While there is no explicit definition in his writings: it appears that Vygotsky uses some kind of "standard" Sausserean interpretation of signs. That is: "a sign is something standing for something for someone".
7 The notion of mediation overriding perceptually given information will return in 4.2.2 and as an integral part for the hypothesis presented in 5.3.

2.2.3. Empirical Support

As a developmental psychologist, Vygotsky studied the *egocentric speech* of children. He argued that egocentric speech serves as a link in the development of inner speech and a fully developed mental functioning (Vygotsky, 1986: 86-87). To support this claim, studies were conducted where children had to solve a task at first without speech and later allowed to employ (egocentric) speech. When not utilizing egocentric speech, the children were incapable to solve the task. When given permission to speak, the children solved the task in most cases. As the task became harder, an increase in employment of egocentric speech was documented. Vygotsky concluded that language is used to mediate thought and serves as a way to set up contra-factual (make-believe) situations from which we can, in a linguistic-cognitive domain, construct a plan and thus lead ourselves to a desirable outcome (ibid). This further supports the claim that the more demanding a task is, the more linguistic employment is required. The conclusion is thus that the cognitive demand to some extent will determine the linguistic impact.

As mentioned, Vygotsky, together with Luria (1979), compared illiterate and recently literate people in their categorization of objects. A difference was found insofar as the literate participants leaned towards abstract reasoning: a tendency to group objects in sets unfamiliar to the illiterate. In contrast, the illiterate group arranged items based on concrete settings or contexts with which they were familiar. That is, the literate group was more inclined to rely on *znachenie*: abstract reasoning and decontextualized concepts. The illiterate group used contextualized, perceptually given categorization, i.e. *smisl*. It seems that mediation is not just a matter of degree, but might even differ in kind depending on the semiotic resources available.

2.2.4. Summary

The central argument of Vygotsky is language as a socially shared foundation for human cognition, i.e. declarative memory and voluntary attention, as well as logical and abstract reasoning. These capacities are internalized in ontogeny, which enables the development of typical human functions. Depending on how well we master language and even more so on the situation at hand, mediation seems to differ both in kind and degree. If we are presented with a demanding (in cognitive terms) task, we are inclined to rely more on language to mediate between perception and behavior. This implies task-dependency: the task at hand will determine the kind of mediation and cognitive processes active (thus even determine the degree of linguistic influence). If language mediates thought, then mediation will yield an explicit analysis of the situation in terms of the linguistically encoded components of the situation. We will return to this in 2.5. and 5.3.

Even though Vygotsky in always illustrates Semiotic Mediation with linguistic examples, there is a lack of a developed comprehension of language. It seems that Vygotsky ignored every aspect of semantics apart from lexical meaning. This is troublesome, but as noted by Wertsch (1985: 55) we can overcome this problem by incorporating advances in linguistic theory to the Vygotskyan program. This stresses the need to explore the linguistic aspect of the language-thought nexus. We do so by turning to The Principle of Linguistic Relativity, as proposed by Whorf (1956).

2.3. A Rose by any other Name...?

All too often Linguistic Relativity has been in disregard, as either too much (or not enough) has been read into it. Consequently, the principle was treated as an abomination to the scientific world. However, in the last 10-15 years Linguistic Relativity has been redeemed. Thanks to the contributions by Lucy (1985; 1992; 1996; 1997), Slobin (1996; 2003) and many others, the principle has gained scientific value.

In this section, the specific qualities of the principle will be summarized (for extensive and critical reviews of the principle, see Lucy, 1992; Pourcel, 2005; Blomberg, 2006). Intentionally, this part will be rather short since little can be added to a notion so thoroughly explored as Linguistic Relativity. Nevertheless, an investigation of the linguistic impact on thought would be incomplete without the principle.

2.3.1. The Core of Linguistic Relativity

Linguistic Relativity can be summarized in the following derivation (c.f Gentner and Goldin-Meadow, 2003):

(I)   Languages differ to a significant degree in their semantic structure.
(II)   The semantic structures influence how we categorize our experience of reality.
....
(III) Thus, speakers of different languages will categorize their experience of reality in different ways.

In terms of context-dependency (or not), Whorf clearly proposed an independent version: the linguistic influence on thought is pervasive.

Whorf's central claim is the linguistic influence upon *habitual thought* (Whorf: 1956).[8] This is to be understood as the "world" inside of us, which we use to get a grip of the pre-linguistic world as a *"kaleidoscopic flux of impressions"* (ibid: 213).[9] Through the linguistic impact on habitual thought, our categorization of reality is shaped in accordance with linguistic patterns. These patterns thus become an active part of human thought. Since divergent languages employ different patterning, linguistic impact renders incommensurable world-views depending on (widely) different languages.

To fully comprehend the Whorfian argument the above-mentioned derivation needs to be clarified. First, languages differ in how they categorize the world presented to us. This is an argument made clear by one of Whorf's predecessor Boas (1911). According to Boas, the possible experiences can vary ad infinitum. However, the means to express them are finite:

> Since the total range of personal experience which language serves to express is infinitely varied, and its whole scope must be expressed by a limited number of phonetic groups, it is obvious that an extended classification of experiences must underlie all speech (ibid: 20)

Language is primarily communicative and in order to be a suitable means for communication language must classify experience in some way. This is manifested by the obligatory categories of a language (e.g. by determining the time of an occurrence with tense or other time expressions). Whorf adapted this conviction while further adding an assumption of another of his predecessors, Sapir, who claimed that languages are systematic, formally complete systems (Sapir, 1949). That is, it is not this or that particular word that expresses a particular mode of thought, but the coherent and systematic nature of language interacts at a wider level with thought and behavior. A language is primarily a coherent system used to generate meaningful interpretations of experience.

Through its (obligatory) categories a language unites different aspects of experience as "alike", viz. by making their linguistic representations bear the same marking. Whorf labels this phenomenon *linguistic analogy* (Whorf, 1956: 135-148). In our minds, these classifications are associated with one another and thus influence our interpretation of experience. This gives rise to what Sapir called *"relativity of the form of thought"* (1924: 155)*:* an effect that is possible because we accept and employ these linguistic categories as guides in our interpretation of experience – even though these classifications vary across languages. Since these interpretations are language-specific, they become essential in creating relativistic effects.

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8 Note that Whorf uses the predicate 'habitual' to claim that it is not thought in principle that is affected, instead it is how we usually think that becomes affected by language.

9 Whorf does not suggest the prison house version of linguistic relativity. Often such a position has been attributed to him. The pre-linguistic world as "a kaleidoscopic flux of impression" is a rather rhetorical statement and does not imply a total linguistic determinism. Instead, Whorf adopted a Gestalt-psychological model of pre-linguistic experience.

> Users of markedly different grammars are pointed by their grammars toward different types of observation and different evaluations of externally similar acts of observation, and hence not equivalent as observers must arrive at somewhat different views (Whorf, 1956: 221)

Linguistic Relativity arises from the systematic nature of language. We can find the same patterns throughout all levels of linguistic analysis: e.g. morphology, syntax, semantics etc. If we take this system for granted and never question it, we will never notice that the categories and analogies embedded in this system are to some extent "arbitrary".[10]

The most significant (and most quoted) of Whorf's case studies regards how we express and perceive (the experience of) time. Whorf compared how the differing categorizations of time in Hopi and English (ibid: 139). In its whole, this is a far too complex discussion. Put simply, Whorf argues that throughout these two linguistic systems we can find an internally coherent way to express all aspects of time, but when compared with one another they appear as incommensurable. Hopi contains a cyclical perspective on time whereas English objectifies time (e.g. "time flies") and categorize the phenomenon as being linear.[11] In order words, English employs linguistic analogy between time and objects, whereby time as an experiential phenomenon appears as a thing among other things. Furthermore, time is objectified through the use of imaginary plurals (10 days), as well as temporal expressions suggesting location, such as "at sunset". Hopi is said to only use plurals for actual, physical grouping (10 actual men standing over there), whereas time is expressed as a succession, with the help of adverbials and never nouns. Accordingly, the objectification of time is absent in Hopi. Whorf thus concludes that speakers of Hopi experience time as more cyclic than English speakers do.

Let us end our survey of Linguistic Relativity by quoting a famous passage.

> 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... 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: 212-214)

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10 Whorf suggests that the degree of metalinguistic knowledge is rather low. This discussion involves a complicated analysis of the necessary categories for a certain language.

11 One example would be the use of three tenses, in its simplest form past, present and future tense in English. If interpreted in a Whorfian fashion, it certainly could imply an interpretation of time as linear. For a thorough discussion of temporal concepts in Hopi in relation to Whorf's analysis, see Malotki (1983).

2.3.2. Critique and Analysis

When attempting to summarize Linguistic Relativity one walks on a thin line. In some cases the impression is surely that Whorf proposes the "prison house" view of linguistic impact. We must therefore always keep in mind Whorf's Gestalt-psychological claims as well as his explicit rejection of all kinds of thinking as purely linguistic. In his critique of Watson's analysis of thinking as non-executed motor commands in the larynx (Watson, 1913) Whorf clearly refutes such a view.

> Silent thinking is basically not suppressed talking or inaudibly mumbled words or silent laryngeal agitations... Such an explanation merely appears plausible to the linguistically unsophisticated 'common sense' view. (Whorf, 1956: 66-7)

Let us now further analyze the assumptions underlying Linguistic Relativity. The first assumption is an empirical fact: languages do in fact differ in their semantic structure to a considerable extent (see e.g. Croft, 2002). The question in need of an answer is whether the grammar in fact encodes experience to such a large extent and whether these superficial patterns actually contain implicit metaphysical assumptions, such as certain point of views on time and space. For now, the answer remains uncertain.

Whorf's argument concerning habitual thought and linguistic analogy is not truly convincing.[12] No clear answer is provided as to how language, the means to express our thoughts, shapes our understanding and categorization of the world. Why does the impact go from language to thought when, by appeal to intuition, it seems to be the other way around? As Lucy points out (1985: 92), we must ask ourselves whether there is some cognitive function for natural language facilitating certain kinds of thought which would otherwise be impossible (or at least difficult).

2.4. The Thinking-for-Speaking Program

A less controversial, or at least less exhaustive, suggestion to language and thought is found in Slobin's program of *Thinking-for-Speaking* (Slobin, 1996). The main assumption is the replacement of the static terms *thought* and *language* with the dynamic concepts *thinking and speaking*.

> The consequence of this shift from names of abstract entities to names of activities is to draw attention to the kinds of mental processes that occur during the act of formulating an utterance. (ibid: 71)

> There is a special kind of thinking that is intimately tied to language – namely the thinking that is carried out, on-line, in the process of speaking. (ibid: 74)

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12 Lucy (1985) does however interpret and develop the notion of habitual thought to a more plausible notion. In such an interpretation, some similarities between habitual thought and *conceptual holism* (Quine, 1953:16) can be found.

Slobin suggests that linguistic patterns are an intrinsic part of thinking when in the act of speaking. That is, the linguistic framing of an actual speech act will determine how the situation is comprehended. By speaking, the activity of thinking is moulded according to the language employed; our thoughts become framed by language. In the presented classification, thinking-for-speaking is at once a context-dependent and a language-specific (relativistic) thesis.

In support of this claim, Slobin conducted a study on speakers of a variety of languages to document how they described a picture storybook (*Frog, where are you,* Mayer, 1969). The results were in the lines of reasoning: we can find differences between how speakers of different native tongues describe these pictures. With the employment of the binary typology for motion (see chapter 3), Slobin found that due to the optional expression of Manner in V-languages these speakers expressed Manner less readily and prefer to give more static descriptions in which the motion could be inferred from the setting and the result of the motion. Speakers of S-languages, on the other hand, produced more of active descriptions consisting of vivid representations of the motion. Slobin calls these documented differences in verbalizations the *rhetorical style* of a language (Slobin, 1996: 76), thus proposing the thinking-for-speaking model. Throughout language acquisition we are

> [...] Guided by the set of grammaticized distinctions in the language to attend to such features of events while speaking (ibid: 86)

When speaking we are inclined to follow a language-dependent thinking. Slobin's conclusion is thus that

> [...] The language or languages we learn in childhood are not neutral coding of an objective reality. Rather, each one is a subjective orientation to the world of human experience, and this orientation **affects the ways in which we think while we are speaking** (ibid: 88)

2.4.1. Evaluation

As pointed out by Pourcel (2005), Slobin's research provides little support for strong relativistic effects in *the categorization of experience as such*, i.e. even when thinking-for-speaking is (apparently) not involved. The fact that our psycholinguistic processes must adapt to language-specific framings when we speak is somewhat tautological. Furthermore, that languages express reality as conceived by human beings is uncontroversial and begs the question whether, and if so to what extent, language affects thought. How can we from observing differences in rhetorical style deduce (or induce) cognitive effects? The fact that we must follow the rules and conventions of language when speaking (and thinking-for-speaking) follows from the impossibility of a "private language" (Wittgenstein, 1951). If languages essentially express how we categorize reality, why are

we unaffected by language when we are not speaking? There is one huge leap in Slobin's argument. The fact that languages do express situations in various ways or emphasize certain features above others, thereby inclining us to follow language-specific discourses, **does not** imply effects on a cognitive scale.

2.5. Summary

This chapter classified different models of the linguistic impact on thought. The reason was partly to survey the most plausible versions of the language-thought connection, partly to serve as a basis for a theoretically open-minded approach when conducting studies in this field. In many respects, the presented models clearly differ in purpose, motivation and conclusions. The survey has found several weaknesses and shortcomings on a theoretical level in all of these programs. Despite the critique, the presented models constitute the best suggestions available if we are to investigate the relation between thought and language. By being as open-minded as possible and not discarding neither plausible nor empirically viable theses, we are given an opportunity to interpret the results in the best way possible.

The notion of Semiotic Mediation according to Vygotsky was the primary concern of this discussion. Since the prior results of Blomberg (2006) were interpreted in such a fashion it was necessary to develop our understanding of mediation properly. The most important part, for the present study, is the task-dependency of mediation, i.e. the task will to some extent determine the kind (and degree) of mediation. It is imperative to furthermore keep in mind that mediation does not occur constantly, but only when we apply our "higher mental processes". Through mediation, a shift will occur to more linguistically framed mental processes, yielding a prominent linguistic impact. The complete notion of Semiotic Mediation is far too complex to fully develop in this essay. We just need to understand that when in a situation which demands higher cognitive attention, language will mediate thought, thus yielding diverging behavior depending on the task. Such processes are due to mediation and its use of "Language as such", not due to specific language patterns.

The main concern of Vygotsky was to understand the development of mental processes, which made the analysis of language fall into the background. Therefore, it is not surprising that no clear explication of the sign concept or a refined linguistic analysis can be found in his writings.

Whorf proposes a context-independent, language-specific version of the language-thought nexus provided by an analysis of language as a classification of experience. To Whorf, language is always present; the effects of language are constant and the categorization of reality will differ between speakers of different tongues. When discussing Whorf the term "categorize" was

deliberately used in a neutral manner to illustrate his claim. On the same grounds as we did with Vygotsky, we can criticize Whorf, viz. an emphasis on just one aspect of the relation between language and thought – in his case language.

Somewhere in between these two positions we find Slobin's thinking-for-speaking. It is at the same time context-dependent and language-specific. According to Slobin, speakers will follow the rhetorical style of their native tongue when in the act of speaking. The advantage of thinking-for-speaking is the testability and the empirical support presented for the thesis. However, some critique to the scientific value of the results is justified.

These different models all predict different effects on the categorization of motion and will serve as basis for the hypotheses presented in 5.3. Before we turn to these, the domain of study, motion, needs to be explored.

3. The Domain of Motion

One can find a number of reasons to use motion as a domain of study in exploring the connection between language and thought:

– In terms of common sense, we all "know" what motion is, as opposed to the lack of motion, i.e. stasis.
– The motion/stasis contrast is expressed in all languages.
– We can conceptually establish criteria for what constitutes a particular kind of motion, with elements of conventional, though still motivated meanings, such as Path and Manner (described in 3.1.) which are fairly well mirrored in different languages.[13]
– The conceptual characteristics of motion can help us study the relation between language and the categorization of motion without (too many) ethnocentric biases.

We begin this chapter by presenting some theoretical background to the domain of motion, by reviewing the influential studies of Talmy (1985, 1991, 2000). Some conceptual and empirical objections to this analysis do however stress the need for a new taxonomy of motion. Following Zlatev et al (in press) 3.2. to 3.4. present the theoretical necessities for this taxonomy together with the taxonomy itself. 3.2. introduces the Vendlerian analysis of *situation types* (Vendler, 1967), serving as an inspiration for the proposed taxonomy. 3.3. captures the general qualities of motion in experiential terms, as well as briefly outlining the different parameters for motion in the taxonomy. The chapter ends in 3.4 by "combining" motion and situation types into *motion situations*. In discussing the components of motion events and situations "small caps" will be used when referring to the supposedly non-linguistic concepts (e.g. PATH). A single capital letter (e.g. Path) will be employed when language-specific and conventional meanings are intended (cf. Zlatev, 1997).

3.1. Background: Motion in Linguistics and Cognition

The domain of motion was brought to the attention of contemporary linguistic typology by Talmy (1985, 1991, 2000). Talmy's approach is to classify motion through its grammaticalized semantic features, using *motion event* as the over-arching term for all kinds of (translational) motion. Ever since Slobin's study (1996), this typology has been employed in neo-Whorfian research.

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13 See Zlatev and Yangklang (2004), Zlatev and David (2005) and the various chapters in Strömqvist and Verhoeven (2004) for a thorough exploration to why "fairly well".

Talmy (1985, 2000) considers the "presence of motion", along with the conceptual components (or cognitive categories) FIGURE, GROUND, PATH (which is regarded as the "core schema" of a motion event) and MANNER to constitute a "motion event", exemplified in (1).

(1)	Othello	sailed	from	Venice	to	Cyprus
	FIGURE	**MANNER**	**PATH**	**GROUND**	**PATH**	**GROUND**
		MOTION				

Depending on the way these conceptual elements are mapped to linguistic form-classes, Talmy formulates the basis for his well-known typology, shown schematically in Figure 3.1 (from Zlatev et al, in press), with example sentences in English (a satellite-framed, or S-language) and French (a verb-framed, or V-language).
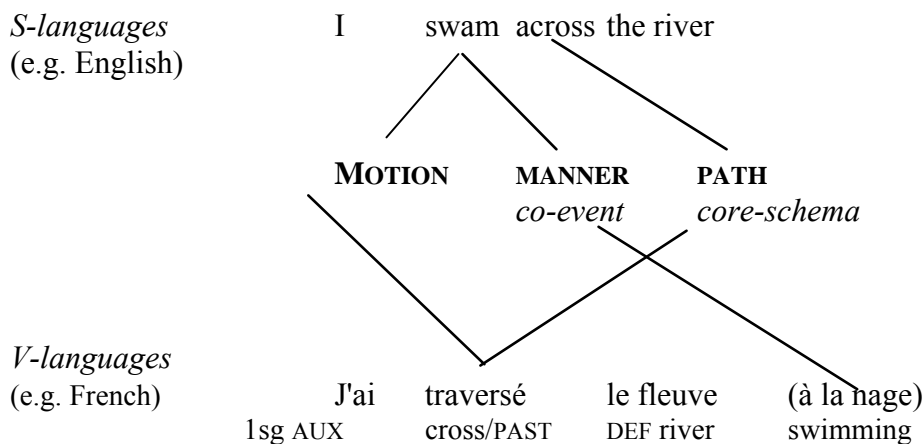
Figure 3.1. Different mapping patterns between the conceptual components of motion events and parts-of-speech in satellite-framed (S) languages and verb-framed (V) languages

The main difference between an S-language and a V-language is in how PATH is mapped, which Talmy considers to be the "core-schema", or frame of the motion event.[14] A V-language typically maps PATH to the main verb of the clause while MANNER is expressed by an optional constituent, or in a separate clause. S-languages on the other hand conflate MANNER into the main verb and express PATH with a satellite, such as a particle. A satellite is, according to Talmy (1985), an *immediate sister* to the verb root, i.e. semantically and syntactically the satellite is closely related to the verb root. Satellites are to be distinguished from prepositions in prepositional phrases: the latter can be

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14 One can find a large number of differences between S- and V-languages, however the distinction is founded upon how Path is encoded.

omitted (in context) without meaning change, as in (2). On the other hand, by omitting the satellite, the meaning changes drastically as seen in (3).

(2)   He went *out* (of the house).
(3)   He went.

A V-language is further said to follow the *boundary-crossing constraint* (Slobin and Hoiting, 1994), which states that a V-language cannot have a Manner-verb in the representation of an event where a boundary is crossed. On the other hand, in an S-language boundary crossing is easily expressed using manner verbs (e.g. *Desdemona ran into the room*). This binary typology in S- and V-languages has been claimed to be exhaustive, i.e. all languages of the world can be categorized as being, predominantly, an S- or a V-language.

Recently, the validity of this typology has been debated. It seems to be conceptually as well as empirically problematic – a number of languages, e.g. Tzeltal (Brown, 2004) and Russian (Smith, 2003) do not fit into the classification. Closer analyses of Thai show that it behaves as a V-language in certain respects, as an S-language in other, while differing from both in third respects (Zlatev and Yangklang, 2004).

On a conceptual level, Talmy distinguished translational motion in which *"an object's basic location shifts from one point to another in space"*, from self-contained motion, where *"an object keeps its basic, or 'average' location"* (Talmy 2000: 35). Talmy's typology only regards motion of the first kind, exemplified in (4) but not self-contained motion, illustrated in (5):

(4)   Hamlet went to the throne room.   (Translational motion)
(5)   Romeo is swimming in the pool.   (Self-contained motion)

In these examples it is fairly obvious why we should treat them as different kinds of motion, but Talmy's theory is less clear about examples such as (6): Is the motion involved translational or not?

(6)   Puck ran in the garden.

This and similar problems discussed by Blomberg (2006) and Zlatev et al (in press) suggests that the conceptual framework is in need of revision.[15] In the remaining part of this chapter an

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[15] There have been some attempts to overcome the major objections to Talmy's framework while still maintaining the conceptual apparatus and presented typology. Among the most ambitious attempts we find Pourcel's (2005) conceptual analysis of motion in terms of "motion events" vs. "motion activities".

experientially based view on motion will be introduced, following the taxonomy presented in Zlatev et al (in press). To anticipate, the term *motion situation* will be applied as the over-arching term for motion in favor of Talmy's motion event. The taxonomy itself awaits in 3.4, after a presentation of the factors determining a motion situation, Situation Types in 3.2 and Motion in 3.3.

The differences between Talmy's motion event typology and our taxonomy concern above all the analysis of types of situations. The lack of typological studies within the taxonomy leads me to utilize the distinction between S- and V-languages to describe languages predominantly of either kind, such as Swedish (S-language) and French (V-language).

3.2. Situation Types

One must consider *Verbs and Times* (Vendler, 1967) among the most influential essays written in the field of philosophical linguistics. Vendler's attempt is to define, in his words, *the varying time schemata* (ibid: 98) or situation types expressed by verbal expressions. The essence of a situation type is its temporal qualities: whether something is going on, changing or ending. Roughly, this classification corresponds to how Zlatev et al (in press) analyze motion situations – with the additional fact that motion contains the change of a Figure with respect to a Ground (more on motion in 3.3.). Vendler distinguishes four different situation types (ibid: 106) which can be defined as follows using the "features" *boundedness* (i.e. a natural endpoint), *protraction* in time (vs. compression) and *dynamism* (i.e. perceived change).

    (i)   *Activities*: unbounded, protracted in time dynamic situations

    (ii)   *Accomplishments*: bounded, protracted in time dynamic situations

    (iii)   *Achievements*: bounded, non-protracted dynamic situations.

    (iv)   *States*: unbounded, protracted, non-dynamic situations

These are respectively expressed by (7) – (10):

    (7)   Hamlet is reading (words, words, words).

    (8)   Macbeth wrote a letter to Lady Macbeth (for one hour).

    (9)   Othello reached Cyprus.

    (10)   Romeo loves Juliet.

The different situation types distinguish the temporal width and quality of a proposition. Note however, that tense and aspect markers do not necessarily imply a certain situation type. Often

accomplishments or achievements are presented in past tense; therefore implying the situation as completed, but (11) expresses an activity, since boundedness is not expressed, despite the use of the past tense. Some find it hard to accept that 'fall' expresses an unbounded motion situation, given the (pragmatic) implication of reaching an end point. However, consider examples from the British National Corpus such as: *The devaluation of stock as component price fell*. As long as economics are governed by the principle of supply and demand, values will not hit rock bottom. Thus, here 'fall' is used (in the past tense) to metaphorically express an unbounded motion.

(11)   Alice fell (and fell).

The sentence in (12) is on the other hand given in the present tense, though it still represents an accomplishment. To differentiate between different kinds of situation types the lexical meaning of the verb together with its prepositional phrase is sufficient. On top of this, many languages utilize tense and aspect to profile different qualities of the situation, either the process or the state-transition. This especially applies to accomplishments, which have to do with a process as *leading* to a state-transition. We can thereby choose to emphasize either the active part (as in 12), or the state-transition (13).

(12)   Hamlet is going to the churchyard.
(13)   Hamlet went to the churchyard.

In the following, I will adopt Vendler's taxonomy of situation types, but replace Vendler's term "activity" with *Process*. Such a shift in terms is because "activity" is highly connected to human agency, while motion surely might involve agency not governed by intentionality. Accomplishments will not be distinguished from achievements; situations containing a state-transition are labeled *Events*. States constitute situations that do not involve motion and they will therefore be disregarded in the following discussion.

3.3. Towards an Experiential View on Motion

As noted by Itkonen (1991), though with roots in antiquity, language does not describe *reality itself* but rather *reality as conceived by human beings*.[13] Based on Zlatev et al (in press), an experientially

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[16] This notion of language as a mirror to the human lifeworld has received considerable attention in the field of *Cognitive Linguistics* (see e.g. Lakoff, 1987). However, as shown by Itkonen (1991), such a notion is neither controversial nor novel.

based perspective on classifying motion is here suggested, while using the situation type model to semantically classify the different kinds of situations expressed by the verb phrase. This is not due to a philosophical stance on whether motion exists independently of the mind or not. Rather, it is a suitable point to start investigating the different ways languages code motion and the way in which motion is understood. Furthermore, when conducting experiments in the behavioral sciences we must have a clear view of how the phenomenon investigated appears to human beings. How can we, in this particular case, otherwise maintain that language impinges upon categorization without properly understanding how motion appears to us?

A start to define motion in phenomenological terms could be: *the perception of physical change*. In this definition, 'perception' is the keyword, not 'physical change'. However, by this definition both (14) and (15) would be expressions of "motion".

(14)   The vase broke.
(15)   The chameleon shifted colour.

As shown by the examples above, this definition is too broad. We must therefore distinguish motion from other kinds of physical changes we perceive, and thus define motion as (*the experience of) continuous change in the relative position of a Figure against a Ground*, as opposed to discontinuous change (something appears in one position, then in another), or stasis, where no change occurs. This means that motion is expressed by presenting a Figure that explicitly changes its relative position against a defined scene (Ground).

After being able to distinguish motion from other kinds of (perception of) physical change, we will now attempt to distinguish between different kinds of motion situations. Three binary parameters for motion will be presented and explained throughout this section. Two of these parameters rely on the notion of linguistic *Frame of Reference*. When necessary this notion will be described. Following Zlatev et al (in press) I propose that through these parameters all kinds of motion available to the human lifeworld can be categorized.

Parameter 1: Translocation / Non-Translocation

This parameter is analogous to, but more transparent than Talmy's notion of "translational motion". Since the Figure undergoes a (continuous) physical change against an undefined ground, (16) expresses motion, but since the average position of the Figure remains unchanged, there is no translocation. On the other hand, since in (17) the Figure ('Ophelia') changes its average location,

we do have translocation.

| (16) | The machine broke down | (Non-translocative motion) |
| (17) | Ophelia ran across the yard. | (Translocative motion) |

When expressing translocation, apart from setting the Figure against a Ground, we further adapt to a certain *Frame of Reference*. This concept has received considerable attention lately within the fields of cognitive science and neuroscience (e.g. Berthoz 2000). As interesting as that may be, our attention will be limited to *linguistic* Frames of Reference (FoR), which are characterized by (Zlatev, 2005: 5) as follows:

> In the most general sense, a FoR defines one or more reference points, and possibly also a coordinate system of axes and angles. Depending on the types of the reference points and coordinates different types of FoR can be defined.

A typologically valid attempt to distinguish the different kinds of Frames of Reference was put forward by Levinson (1996). Across languages, Levinson found three distinct Frames of Reference, which he labeled *Relative, Absolute* and *Intrinsic*. However, this analysis is only based on horizontal static projective relations. Since Frames of Reference can equally well be applied to a vertical plane and dynamic situations, Zlatev (2005) extends Levinson's model using the following terms:

- **Viewpoint-centered**: An expression involving the perspective of the speaker, hearer or an imaginary discourse participant as reference points.

(18)	Go to the right!	**FoR**: Viewpoint, Speaker.
(19)	Go to your right!	**FoR**: Viewpoint, Hearer.
(20)	As John walked in the corridor, he turned right.	**FoR**: Viewpoint, Imaginary participant.

- **Geocentric**: Involves the horizontal or vertical plan while relying on geo-cardinal positions as reference points.

| (21) | Go West! | **FoR**: Geo-Centric. |

- **Object-centered**: Either an external object (i.e. a Landmark) can be used as a reference

point, or the Figure itself.

(22)   Go towards the setting sun!   **FoR**: Object-Centered,
                                                                      Landmark-defined.

(23)   Go forward!   **FoR**: Object-Centered,
                                                                      Figure-defined.

As examples (21) and (22) show, the *actual* reference point can be the same, but there are nevertheless different linguistic Frames of References. Each time we express translocational motion, we rely on one or more Frames of Reference, which provide the reference point(s) according to which it is possible to deem that a change of location takes place. On the other hand, when expressing non-translocational motion, a Frame of Reference is not necessary since the motion is determined only against a nonspecific Ground. As we use the terms, the difference between a Landmark and a Ground is that Ground is the "scene" for the motion situation, whereas Landmark is a specific entity, expressed by a noun phrase (cf. Zlatev 2005).

Parameter 2: Bounded / Non-Bounded

If a motion is *bounded*, it implies a state-transition (c.f. Vendler, 1967). This means that the Figure of motion will depart from a source, pass through a route or reach a goal. That is, the motion situation is fixated with respect to at least one Landmark, as in (25). This is not the case with unbounded motion, which can go on indefinitely. Here, the motion is not fixated – only the general direction of the trajectory is given in relation to a Ground, as in (26).[17]

(25)   Guildenstern strolled into the house.   (Bounded motion)
(26)   Rosencrantz went uphill.   (Unbounded motion)

To distinguish these from one another, the crucial point is how to treat the concept Path: we understand it as implying the boundedness of a motion situation, as in (25), while an unbounded motion (26) only involves Direction (or shape) of motion. That is, Path is always determined by at least one Landmark, whereas Direction is determined on the basis of the reference points provided by the Frame of Reference. Thus, when Direction is further specified with a noun phrase as in (26),

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17 Often this is made clear by distinguishing between "telic Path" and "atelic Path". Since there are as many definitions of "telicity" as there are occurrences of this term (cf. Pourcel, 2005; Saeed, 2002) I will refrain from using the term.

the latter rather lexicalizes a non-specific Ground than a Landmark, Path is only expressed when we adopt the object-centered, landmark-determined Frame of Reference (23).

This parameter is thereby a direct employment of the situation type analysis presented in 3.2. An unbounded motion corresponds to the situation type Process, expressing Direction, while a bounded situation constitutes an Event, expressing Path. Process and Event will be used to refer to these kinds of motion situations.[18]

By distinguishing bounded from non-bounded motion, we can resolve the obscurity between translational and self-contained motion, shown in (6), 'Puck ran in the garden'. Due to its lack of state-transition (6) does not involve Path, thereby being an expression of a Process, together with (5) 'Romeo is swimming in the pool', while (4) 'Hamlet went to the throne room' clearly expresses an Event.

Parameter 3: Self-Caused / Other-Caused

Finally, a motion situation can be either self-propelled or externally caused, my walking across the street versus me being pushed over a cliff. This parameter is merely concerned with the scope of the taxonomy and will not be utilized within the present study or discussed further.

3.4. Motion Situations

Motion situations involve some temporal quality in which we perceive a continuous change in the relative position of a figure according to a frame of reference, thus adding the spatial dimension to the temporal dimension of a general situation type. We can thus use the different parameters presented in 3.3 and combine them in any way with one another to define a taxonomy of motion situations and their expressions. For example, a motion can be classified as a translocative, self-caused and bounded motion situation, as expressed in (27):

(27)   Prospero went to the throne room.

How well the suggested taxonomy corresponds to typological differences between languages is still an open question in need of investigation. The purpose of this chapter was to outline an experiential perspective on motion as the domain of study. One advantage of this taxonomy over the motion event tradition initiated by Talmy is that the boundary-crossing constraint mentioned in 3.1 can be

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18 One weakness can be found in this distinction. Some trajectories fall in between Path and Direction. Such motion situations involve 'circling around' or 'zigzag', where more than the general direction is fixated, though according to our definition of Path, it is not bounded in the sense necessary.

reformulated in terms of preferences, rather than as an exception-less rule:

> Since we define Path as always related to Source, Route or Goal – only translocative events involve Path, while processes contain the category Direction or Location. Thus we can reformulate the famous "boundary-crossing constraint" (Slobin 1997: 44) as follows: **a manner-verb can co-occur with an expression of Direction or Location, but not (or less readily) with Path in the same clause**. (Zlatev at al, in press)

Therefore, we should expect occurrences when the constraint is disobeyed. This reformulation can help us with the interpretation of the results of previous empirical studies described in 4.2.1, as well as with the present study.

Zlatev et al (in press) proposes the following matrix to summarize the different kinds of motion situations available within the taxonomy:

Table 3.1. Illustration of the expression of 8 motion situation types in English; F = Figure, LM=Landmark, A = Agent

	Self motion	Caused motion
Translocative-Event	F goes to LM	A throws F into LM
Translocative-Process	F comes here (Viewpoint-C)	A brings F here (Viewpoint-C)
	F goes up (GeoC)	A pushes F upwards (GeoC)
	F rolls forward (Object-C)	A pushes F forward (Object-C)
Non-translocative- Event	F breaks	A breaks F
Non-translocative- Process	F waves	A waves F

For the present study, only translocative self-motions are of interest. Of great importance to the study is the distinction between Event and Process, based on whether the situation is bounded or not.

4. Prior neo-Whorfian Studies on Motion and Categorization

This chapter summarizes some of the methodology and results from prior studies conducted from a neo-Whorfian perspective on motion. The chapter ends with a summary and some guidelines for future research.

4.1. Methodology in neo-Whorfian Research

The most influential studies almost exclusively utilize non-linguistic tasks through *forced-choice similarity judgements* – thereby following Lucy's (1992) methodological guidelines for research on linguistic impact, i.e. an explicit separation of linguistic categorization from non-linguistic (cognitive) categorization. Often these studies use video-clips, either animated or "real-life" sequences. The general method employed with little or no modifications, is the use of *triads*: a target situation is presented along with two alternatives, one differing from the target with respect to the Path (and in some cases what we call Direction) and the other with respect to Manner. The participant's task is to decide which of the two "is the most similar" to the target. These options can be shown simultaneously, sequentially, together with or separate from the target. Sometimes the participants are asked to give a linguistic description of the target prior to choosing, in order to test a hypothesis akin to thinking-for-speaking.

The most common hypothesis claims that if language impinges on categorization, speakers of a V-language should be predisposed to prefer "same-Path" rather than "same-Manner" to a greater extent than speakers of S-languages, where both components are expressed equally easy. Thus, the binary typology presented by Talmy is an explicit assumption in these studies.

4.2. Recent neo-Whorfian Research

Finkbeiner et al (2002) tested speakers of English (S-language) along with Japanese and Spanish (V-languages). Their stimuli consisted of a number of 40-second long 3D-clips where the alternatives were presented either simultaneously with or after the target. The motion situations presented were chosen deliberately so that they would not be easily linguistically encoded. In terms of task-dependency, the fact that all information is perceptually available in the parallel presentation should counteract mediation through semiotic resources.

Their results showed a considerable stronger preference for Manner in the English group when the alternatives were presented after the target, and thus support for some degree of Linguistic Relativity. When the three clips were presented simultaneously the Manner-bias of the

English group disappeared, leading the authors to conclude that "the apparently non-linguistic task used in Experiment 1 [i.e. serially] actually encouraged the participants to encode the scenes linguistically" (ibid: 454). When the options were presented serially with respect to the target, the "manner prominence" (Slobin, 1996) of English as an S-language became salient. This can explain, in mediational terms (together with typological characteristics), why a Manner-bias was only detected in the English group and only when the options were presented serially.

Gennari, Sloman, Malt and Fitch (2002) compared speakers of two prototypal S- and V-languages, English and Spanish, using 2D-animations with the target- and choice-part presented sequentially. Significant correlations were found when the subjects were asked to describe the target-clip prior to viewing the options and making the choice. These correlations regard Path-bias for the Spanish speakers' categorization preference. This seems to offer support for some version of Slobin's thinking-for-speaking: that linguistic emphasis on Path makes it more cognitive salient.

Papafragou, Masely and Gleitman (2002) suggested an alternative interpretation for a linguistic effect: Since Manner is often expressed in non-obligatory constituents in V-languages, when it is expressed it would be "foregrounded" and thus achieve more *semantic salience* (Talmy, 1985) than in an S-language where Manner and Path are expressed with equal ease. They compared categorization preferences, using static pictures, between speakers of Greek (V-language) and speakers of English. Despite the differences in the linguistic descriptions that followed the predicted patterns (along the lines of Slobin's research), they found no preference for either same-Path or same-Manner choices in either group.

Pourcel (2005) conducted two neo-Whorfian studies on speakers of English and speakers of French. The first involved a categorization task with video clips of simple real life human motion and the second a story-retelling task with a clip from the Charlie Chaplin-movie *City Lights* as stimulus. In the first study Pourcel found no relativistic effect on categorization with or without linguistic description prior to judgment. Instead, the results showed an overall preference for same-Path choice independent of language. An interesting finding was that two types of motion situations, corresponding to our distinction between translocative events and translocative processes described in chapter 3, seem to have been categorized differently. There was a strong Path-bias for the events (or "telic Path"), but when the judgement task was preceded by a linguistic description this bias was nullified, and even shifted to a Manner-bias for the processes (or "atelic Path") (ibid: 243-245).

In the memory task some support for a "weak" Whorfian claim was found. The subjects were shown the clip and asked to retell it and answer some questions 24 hours later. In this task, the French speakers made greater use of Path in their descriptions and had difficulties remembering Manner, while the English speakers displayed the opposite behavior.

4.2.1. Event Triads

Bohnemeyer et al (2001; in press) conducted the most extensive neo-Whorfian research study with participants of 17 typologically, genetically and aerially diverse languages. Their stimuli tool, *The Event Triads elicitation tool*, is the same as the one used in this study, albeit with some modifications in our version (see 4.2.2 and 5.1). The stimuli involved animated sequences of a tomato-like Figure moving in different ways between some boundaries. Since a tomato is spherical to its form the Manner of the motion was limited to rolling, spinning, sliding, and bouncing. The trajectory was either:

- out of a hut into a cave (or vice versa)
- from a tree to a rock (or vice versa)
- up or down a ramp

After a 5-second long target-part the subject was presented with two 5-second long alternatives: one same-Path and one same-Manner, but otherwise identical. The tool has been criticized by e.g. Pourcel (2005: 147) as unnatural and containing a limited number of Manners of motion. The critique is unjustified since the design of the stimuli allows systematic contrasts only in the relevant dimensions of the motion situation, i.e. Path (or Direction) vs. Manner. The stimuli consisted in total of 50 triads, with 38 fillers, leaving 12 actual triads.

The authors found an overall same-Manner bias, but with large differences between languages, from 85% (Polish) to 43% (Jalonke and Jukatek). Therefore, the predicted Whorfian effect could not be established since the results did not coincide with typological belonging. The authors thus conclude that the binary typology in S- and V-languages is insufficient in predicting categorization preferences. Furthermore, the authors argue that a better conceptual and methodological framework is necessary to conduct neo-Whorfian studies.

The study did however yield one interesting finding: across languages the scenes of the tomato moving up or down a ramp was predominantly categorized with a same-Path (or Direction) preference. The explanation suggested by the author is that these scenes might be simpler since they involve just one landmark, where the two other types of situations involved two. Another explanation is however possible: the situation was at least ambiguous between a translocative *process* (just moving upward or downward) and a translocative *event* (moving to "the top" or "the bottom" of the ramp). With the help of the taxonomy presented in Chapter 3 we can interpret these findings as follows: while an event requires analyzing the motion situation with respect to its beginning, middle and/or end, a process can be identified only on the basis of the motion of the

Figure itself. A Process is in this sense indeed "simpler".

When conducting the Event Triads experiment on speakers of French, Swedish and Thai, Zlatev and David (2003) found a similar pattern. An overall Manner bias was found when analyzing all groups. However, this bias was nullified for the French group in the vertical motion situations; once again suggesting a difference between Direction and Path. Following this trail, the post-choice verbalizations for the French group were correlated with the corresponding choice. Some correlations between choice and expression could be found. Based on this, Zlatev et al (in press) suggest the following:

> What this could be attributed to is the relatively higher difficulty of encoding both Path and Manner in the same clause [in French], as opposed to Direction and Manner, which may lead to Manner being expressed separately, as the main verb of a separate clause, and thus making it more *semantically salient*, somewhat along the lines suggested by Papafragou et al. (2002),[...]though not in comparison to other languages, but *in comparison to other types of motion situations within the same language.*

This is a plausible interpretation, since when expressing motion in French the boundary-crossing constraint disfavors expressions of Path and Manner within the same clause, as discussed in 3.4. However, when Manner is expressed in a separate clause it might yield more semantic salience compared to other kinds of motion situations.

4.2.2. Blomberg (2006)

For this study, the Event Triads tool was modified in order to contrast two different experimental situations. The study contained two groups of 12 Swedish-speaking participants, 24 in total.[19] Furthermore, the number of fillers was decreased to eight, instead of the original 38, leaving 20 triads. The task for first group (G1) was left unaltered while the second group (G2) described the motion situation prior to viewing the options. That is, the playback stopped after the target-part and the participant was asked to describe the witnessed motion situation. After describing the situation the participants saw the alternatives and made their choice. Possible correlations between the descriptions and the choices were investigated, not only on a type-by-type basis, but also on a triad-by-triad basis.

The results were much in discrepancy with the neo-Whorfian assumptions. G2 made the same-Path choice in 80% of the cases whereas G1 chose the same-Manner option in nearly 60 % of the cases. An individual correlation between description and choice was strongest for G2. Finally, the Manner preference for G1 in total was nullified for vertical motion situations (just as in Bohnemeyer et al, in press and Zlatev and David, 2003). This offered further support for the

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[19] The participants were all students at Lund University on a variety of levels. On average they were 23.1 years old, knew nearly two languages, apart from native tongue. The gender distribution was even for both groups.

distinction between Event and Process made by Zlatev et al (in press) and presented in 3.3 and 3.4 of this thesis.

Even though the results did not conform to Linguistic Relativity, the findings were rather surprising and interesting. As mentioned, the results were preliminarily given an interpretation in terms of Semiotic Mediation. That is, linguistic description yields an explicit linguistic "parsing" of the components of a motion situation. Our attention is thus directed towards more abstract or conceptually derived components, such as Path, in favor of direct perceptually given components, i.e. Manner (or Direction). Path is not given perceptually, but requires an analysis of the Figure and its motion in relation to the Landmark. This effect can be independent of different languages, i.e. a result of Linguistic Mediation as such.

4.3. Summary

The chapter ends with a summary of the lessons learned from prior studies:
−   The nature of the stimuli, real life contra animated clips, static vs. dynamic seems to affect the categorization behavior of the participants.
−   Linguistic description plays an important role: whether it is present or not and whether it is prior to choice or not renders diverging behavior.
−   More than two languages are necessary to make any conclusive claims.
−   Motion situations that are ambiguous between Events and Processes seems to differ in cognitive categorization.

Furthermore, the following questions remain to be addressed:

−   Why do Swedes, when verbalizing prior to choice, yield such an overwhelming Path?
−   Will speakers of a V-language yield an opposite bias when verbalizing prior to choice? If so we can speak of a "reversed relativity" where the hypothesis suggested by Papafragou et al (2002) may be supported. Alternatively the difficulty in expressing Path and Manner in a single clause in a V-language might, somewhat paradoxically, yield such a Manner-bias.
−   Will we find an overall similar pattern for a group of V-language speakers (such as French), thereby supporting a hypothesis in terms of Semiotic Mediation?

The study described in the remaining chapters will attempt to provide answers to these questions.

5. Methodology

Throughout this chapter all things practical regarding the study are described. The stimuli, Event Triads, will be described in 5.1. followed by a walkthrough of the experimental procedure in 5.2. In 5.3 the specific hypotheses, based on the theories highlighted in chapter 2, are presented. 5.4 ends with an explanation of the tools employed for analysis.

5.1. Stimuli

As mentioned before, this study employs the *Event Triads Elicitation Tool*. This tool, in our version, consists of the original 12 triads (together with 8 fillers, which differ from the actual ones, insofar as they involve other-caused motion as well as variation in irrelevant dimensions, such as shift in colour). As mentioned in 4.2., these represent a smiling tomato-like object moving either:

− From / To a landmark (e.g. the tomato jumps from tree to rock)
− Out of / Into a landmark (e.g. the tomato spins out of the house into the cave)
− Vertically (e.g. the tomato rolls down a ramp)

There were four of each kind. Each triad consisted of one target-part, followed by two simultaneously displayed alternatives, one same-Manner and one same-Path (or same-Direction), shown in Figure 5.1.
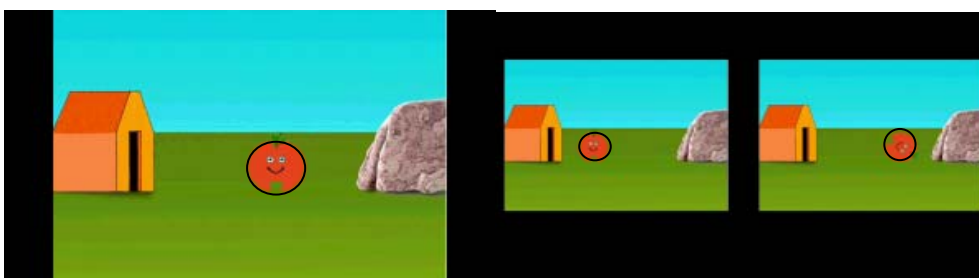
Figure 5.1. Screenshots from *Event Triads*. The left picture shows the target-part where the right displays the alternatives containing one same-Manner (left part) and one same-Path alternative (right part).[20]

5.2. Material and Procedure

The study was conducted at *The University of Montpelier III: Paul Valerý* by Dr. Caroline David and the author. For the experiment we used a laptop running *Microsoft Windows XP Pro*. The

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20 The black markings around the figure were added to the screenshots in order to clearly distinguish the figure from the background.

experimental procedure was handled by the program *Scriptrunner*, developed for this study.[21] Scriptrunner loads a number of pre-specified scripts containing information about the order in which the clips are to be shown. For playback and recording *mplayer* and *Digital Wave Player* respectively were used. The statistical analysis was performed using *SPSS* and MS *Excel*.

The participants were first welcomed, introduced to the experiment and asked to consent to their participation by signing a consent form (Appendix I). A few short questions regarding name, age, knowledge of other languages, etc. were asked and noted on a coding sheet (Appendix II) before the experiment began. The participant was thereafter instructed in the experimental procedure in their native tongue and asked to give her choice by pointing to the alternative found to be most similar to the target.

In the study, 32 French-speaking participants took part, split evenly in 16 for each task.[22] To make cross-linguistic comparisons with the Swedish group as simple and justified as possible only the first 12 of each group (24 in total, abbreviated FG) were analyzed (labeled FG1 & FG2).

FG1 witnessed the entire triad and made their choices; when ready, the participant pressed any key to continue with the next triad. After viewing the entire session, a short break followed before the participant viewed the target-part of each triad once again and gave a verbal description of the situation. For FG2 the playback stopped after each target-part and the participant was asked to give a description. When ready, the participant pressed any key and the two alternatives followed. This procedure was repeated for all the 20 triads.

These results were then compared with those of the Swedish speakers studied by Blomberg (2006). The Swedish groups will be referred to as SG (entire group), SG1 and SG2 for Group 1 respectively Group 2 for the remainder of the thesis.

5.3. Hypotheses

Due to the complex relation between language and thought, together with the contradictory results in prior studies, a theoretically open-minded approach seemed preferable. The theoretical approaches to language and thought, presented in Chapter 2, can serve as the basis for the formulation of alternative hypotheses. On a number of parameters, these models yield different predictions. These parameters primarily involve differences within language (i.e. FG1 vs. FG2) and differences between languages (i.e. FG vs. SG).

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21 Scriptrunner is released under GPLv2, see: http://www.gnu.org/licenses/gpl.txt

22 All participants were students at The Univeristy of Montpelier III on a variety of educational level, ranging from first year students to master students. Their average age was 21.1 years old and on average they knew 2 languages, apart from native tongue. The gender distribution was 10 females and 2 males for both groups.

Model I: Context-dependent, language-general

We will find clear-cut differences in behavior between FG1 and FG2. In the task of describing the situation prior to choice, the model predicts a categorization preference towards the conceptually more complex Path, since a conceptual analysis of the motion situation will be performed during the description. Thus, the employment of linguistic mediation in FG2 will differentiate the groups. We can find at least three different reasons as to why a more linguistically meditated categorization occurs for FG2:

−   The temporal gap between the target and the options might yield an effect on short-time memory where language is used to facilitate the situation.
−   The description as such enables a linguistic mediation where Path is made explicit and becomes highlighted in cognitive processing.
−   There are two tasks to solve for the participant: describing and choosing. It should be the case that this is more demanding than doing just one at a time. This higher cognitive load will further enhance analysis of the motion situation, yielding categorization preferences towards same-Path.

Participants in G1 will on the other hand categorize on the basis of less mediated processes and therefore tend to match the feature most perceptually salient in the target part with its most similar alternative, i.e. Manner. Therefore, it is not surprising if we find a Path-bias for FG2 while FG1 displays a same-Manner categorization preference. Most importantly, due to the nature of mediation, we will find the differences to be between groups, not between languages.

Model II: Context-independent, language-specific

The ubiquitous presence of language in thought will not yield any significant differences between the French groups. The judgement task will however unveil differences between speakers of typologically diverging languages (i.e. between FG and SG differences in categorization are expected). It might be that this effect is more prominent when speaking, as for FG2.

Both an overall Manner-bias and an overall Path-bias can be interpreted in terms of Model II, though the categorization preferences must be coherent within one and the same language. If the French speakers show an overall Path-bias it will be in accordance with the hypotheses of most prior studies. On the other hand, a significant Manner preference could be explained by the salience given to Manner when it is expressed (see Papafragou et al, 2002; Zlatev et al, in press). Finally, a

strong correlation between description and choice are expected on all levels of analysis (triad-by-triad, individual, and group).

Model III: Context-dependent, language-specific

Somewhere in between Model I and II we find thinking-for-speaking. In this model a linguistic impact is likely to appear when verbalizing prior to choice, as predicted in Model I. It deviates from Model I insofar as the typological differences between languages will yield effects in categorization preference, as predicted in Model II. However, the pervasiveness of this effect is primarily limited to the act of speaking, thereby differing from Model II.

In FG2, we will find a significant same-Path preference, since French is hypothesized as a V-language, together with a strong correlation between description and choice on a triad-by-triad basis. For FG1 we cannot predict any linguistic effect on categorization preferences; however it is a possibility, since a covert employment of language might be involved.

5.3.1. Summary of the Hypotheses

We can schematically sum up the results predicted by these three models. The aspects concerned are differences between language, GF vs. GS and differences within language (verbalizing prior to choice or not), i.e. FG1 vs. FG2. We also investigate if we can find a correlation between descriptions and choices. Please note that the two first predictions regard categorization preference, while the last explicitly compares the preferences in relation to the description given.

Table 5.1. A schematic summary of the predictions for each presented model.

Predictions	Model I	Model II	Model III
FG1 ≠ FG2	Yes	No	Yes
FG ≠ SG	No	Yes	Yes
Description-Choice correlation	G2 only	Yes	G2 only

5.4. Analysis

The alternatives chosen were noted on a coding sheet (Appendix II) and later analyzed with SPSS. Comparisons and significance tests were made between groups, languages and kinds of motion situations with respect to choice.

The descriptions were transcribed and tagged by Dr. Caroline David. These were tagged for

occurrences of Path, Direction and Manner, both types and tokens. For a phrase to be classified as Path it must explicitly express boundedness. Therefore expression such as "from left to right" or "upwards" are classified as expressions of Direction, but "from the tree to the hut" or "to the top of the hill" are tagged for Path. Naturally, the ramp scenes will not express boundedness as often as the other kinds of situations. Regarding the expressions containing Direction, a distinction was made with respect to the kind of Frame of Reference expressed (see 3.3). Since Direction is in itself unspecified with respect to Frame of Reference, the descriptions were tagged according to this parameter as well.

The choices were later analyzed together with the corresponding description in order to reveal whether a significant correlation between the two could be found. If such a correlation is found, it suggests a connection between language and thought without further specifying the direction of causation. This analysis was made on a triad-by-triad basis, thus investigating the most atomic component in the study.

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6. Results

All results from the study are presented in this chapter and compared with those of Blomberg (2006). The results are given without further discussing their possible interpretations – something we leave for Chapter 7. Some comments about which model(s) the results support will however be noted. Please note that, if not mentioned, all numbers in the figures are given in absolute. Since the stimuli doesn't allow a clear-cut demarcation between Path and Direction they are in categorization preferences treated as one and the same option

6.1. Prediction: FG1 ≠ FG2

This prediction compares categorization preferences for two French groups, shown in Figure 6.1.
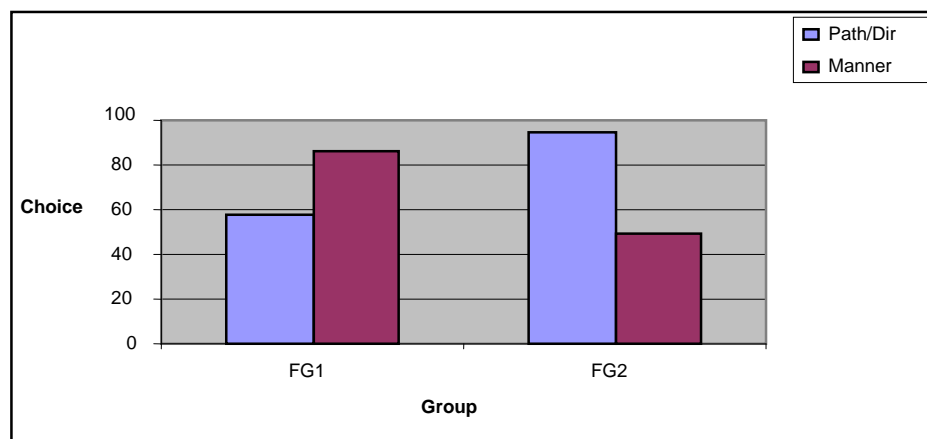
Figure 6.1. Results from the similarity judgement task, contrasting the French groups. Numbers in total

When distinguishing the groups we find close to opposite categorization preferences: 84 of 144 (55 %) of the choices for FG1 were Manner-choices while 96 of 144 (70 %) of FG2 preferred Path. This supports both Models I and III: the latter since French is a V-language which should favor same-Path choices. Furthermore, this effect appears only when verbalizing prior to choice (FG2). Model I is supported since Path is an aspect of the motion situation which is more complex (or "global") than Manner; (explicit) linguistic mediation can be expected to yield increased attention to conceptual rather than perceptual structure.

6.2. Prediction: FG ≠ SG

The overall results in the similarity judgement task for the French and Swedish groups are shown in Figure 6.2.
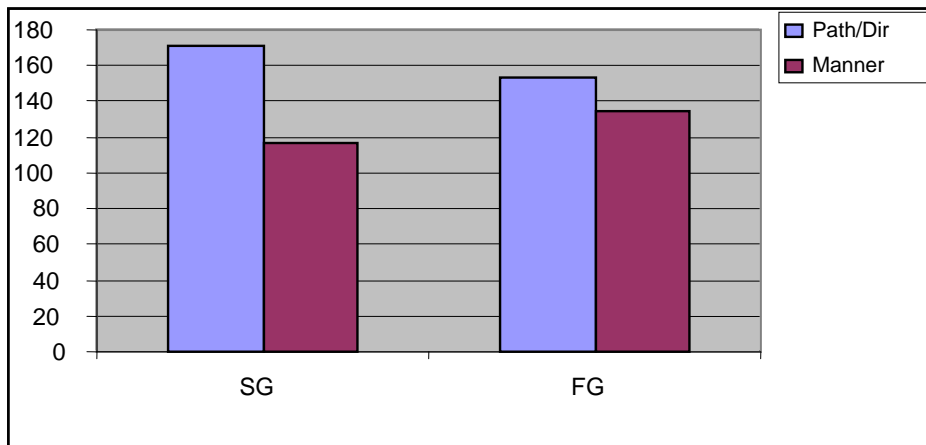
Figure 6.2. The total number of choices for the Swedish and French group. Numbers in total

A majority of the preferred choices were Path for both SG and FG, with a slight overweight for same-Path categorization for the Swedish participants. Taken as such, this supports Model I. While no drastic differences are revealed when comparing the total results, differences could be found when comparing both groups and languages, cf. Figure 6.3.
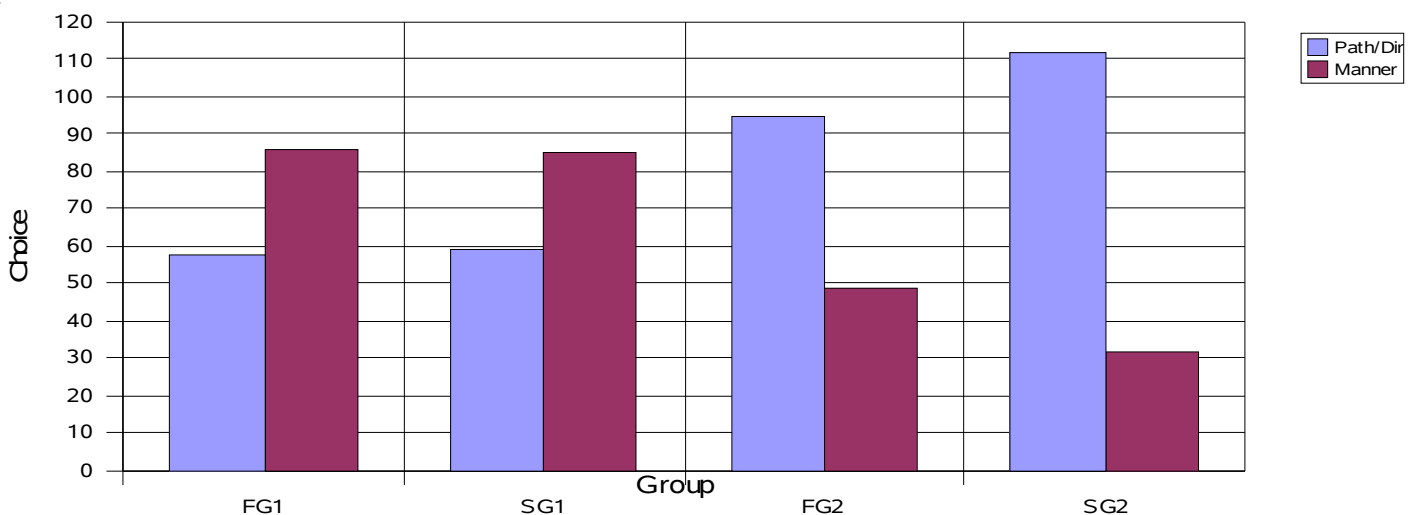
Figure 6.3. Results from the similarity judgement task when distinguishing between languages and groups. Numbers in total.

Statistical analysis was conducted by comparing languages and group (understood as task-dependent, not language-dependent). We used an *Analysis of Variance* providing us with an F-value with corresponding significance value (if $p<.05$, then significant for the F-value). The differences between languages proved not to be significant (for F-value= .396, $p= .532>.05$), while the differences between the groups, understood as the G1s compared to the G2s were significant (for F-value=9.898, $p=.03<.05$). The interaction between language and group was insignificant (for

F-value= .313, p=579>.05). Since these tests gave a clear view of the results, there was no need to break down the categorization preference for the different kinds of motion situations.

This supports Model I, since there are significant differences between groups within the same language. It is however rather surprising, considering how French maps Path, that the Path-bias for FG2 was *less* predominant than for SG2.

6.3. Descriptions

Some parts of the analysis of the descriptions, made by Dr. Caroline David, will be presented here, mainly to show which expressions were considered to denote which category (or expression-type). When the descriptions are correlated with their corresponding choice, it is important to note which expressions are regarded as which expression-type. We begin by giving some examples of expressions of the different categories mentioned in 5.4. Since the models considered do not make predictions for any quantitative patterns in the descriptions, the actual numbers of each type of expression and category will not be discussed. An illustration of how the coding of the utterances was made is presented in the Table 6.1. A similar re-classification of the Swedish data from Blomberg (2006) was made, adding the distinctions for Frames of Reference in the case of Direction.

Table 6.1. Typical expressions from the French group of different expression-types with free translations.

	Path	Manner	Direction (including Frame of Reference)	Other
Verb	*sort (d'une maison)* "goes (out of a house)"	*tomate rouge sautille d'un rocher* "the red tomato jumps to a rock"	VC: n/a GC: *monte une pente* "Climbs a slope" OC: *une pomme rouge avance.* "a red apple advances"	*aller* "goes"
Participle	*[...] sortant du rocher* "[…] leaving the rock"	*[...] remonte la pente en roulant* "[…] climbs the slope by rolling."	VC: n/a GC: *[…] glisse d'une montagne en descendant* "[…] slides a mountain by descending " OC: no data	*deplacant* "moving"
PP	*d'un rocher à une cabane* "from a rock to a tree"	n/a	VC: *sur la gauche* "to the left"	irrelevant
Other	n/a	*[...] qui fait des petits sauts* "[…] that makes small jumps"	no data	irrelevant

Table 6.2 shows the distribution of expression-types, divided by group and language. The analysis has only been made on the basis of whether a particular category was present in the description or

not (e.g. if Manner was expressed twice in a description, it was only counted once).

Table 6.2. Occurrences of the different expression-types in the descriptions.

Group	Direction: Viewpoint-C	Direction: GeoC	Direction: Object-C	Path	Manner
FG1	37	45	22	97	115
FG2	50	43	8	84	103
SG1	41	57	3	98	134
SG2	43	52	1	83	112

The most striking observation is the virtual lack of the Object-Centered Frame of Reference in the Swedish group. With appeal to the author's linguistic intuition this is not all too surprising, since in Swedish the Object-Centered FoR expressions such as *Tomaten rullar framåt* ('The tomato goes forward') would be a rather unnatural way to describe the particular motion situations displayed. That this may to some extent also apply to the French speakers was shown by the lower number of such expressions in FG2, when the descriptions were provided prior to choice, and thus under time and memory pressure. In FG1, however, the descriptions could be given with more "flourish" after the choice part of the experiment was completed. Still, the fact that even FG2 was higher than SG1 is potentially typologically significant and should be further explored.

Furthermore, the French speakers use Manner less often than the Swedes, which is not surprising considering French is a V-language. On the other hand, the findings of Slobin (1996), suggesting that V-languages tend to give more of a static description of a situation, were not shown in this task, given that the numbers of Path-occurrences are close to equal between languages. Hence, the French speakers do not frame the motion to its setting anymore than the Swedes do. To make any conclusive claims, more studies of the descriptions should be made.

When the analysis was applied not only on a group level, but also on different kinds of stimuli as shown in Table 6.3, other patterns could be found.

Table 6.3. Occurrences of different expression-types when distinguishing kinds of motion situations.

		Viewpoint-C	GeoC	Object-C	Path	Manner
	From/To	14	3	9	44	39
FG1	Out/In	11	0	10	47	37
	Vertical	12	42	3	6	39
	From/To	21	0	6	37	36
FG2	Out/In	21	0	2	45	29
	Vertical	9	43	0	2	39
	From/To	19	0	0	46	45
SG1	Out/In	19	0	0	48	45
	Vertical	21	40	3	4	44
	From/To	17	0	1	41	35
SG2	Out/In	17	0	0	41	37
	Vertical	16	43	0	1	38

We see that there are clear differences in the descriptions of the vertical motion situations compared to the other stimuli: Path was seldom expressed for the Verticals, while Direction in a Geocentric Frame of Reference is expressed almost in every description of these "ramp scenes" – independent of language and group. Furthermore, the Geocentric Frame of Reference is hardly ever expressed in any other context. Apart from this, there are rather minor differences with respect to occurrences of expression-types between groups and languages.

6.4. Prediction: Description-Choice Correlation

The last of our three predictions is concerned with, at least, a correlation between each description with its corresponding choice. The statistical analysis provided us with Table 6.4., which shows the correlation for each group for each kind of motion situation – in relation to the categories discussed earlier. A weak correlation is said to be $\pm$ .3, while a strong is $\pm$ .5 and upwards (though this is rather unusual) according to the *Pearson Correlation*. The presented correlations are significant at the .05 level (2-tailed).

Table 6.4. Correlations of significant value between elements in descriptions and corresponding choice.

Group	Type	Direction	Path	Manner
	From/To	Not significant	Not significant	Not significant
FG1	Out/In	Not significant	Not significant	Not significant
	Vertical	Not significant	.308	Not significant
	From/To	Not significant	Not significant	Not significant
FG2	Out/In	Not significant	Not significant	-.304
	Vertical	Not significant	Not significant	-.329
	From/To	Not significant	-.309	Not significant
SG1	Out/In	-.338	Not significant	Not significant
	Vertical	-.302	Not significant	Not significant
	From/To	Not significant	-.307	Not significant
SG2	Out/In	Not significant	-.443	Not significant
	Vertical	.674	Not significant	Not significant

As shown in Table 6.4., there were a few weak correlations for the two French groups. Meanwhile, SG2 in particular displays the most prominent correlations. One might notice one interesting difference in FG2 in relation to the other groups: the correlations are for Manner – not Direction (not even when breaking down with respect to the different Frames of Reference) or Path. Furthermore, there are differences between groups and between languages: for the Swedes the difference consists in higher degree of correlation when verbalizing prior to choice than otherwise. The French groups differ with respect to type of correlation. As we shall argue in Chapter 7, this gives some support for Model III (in a modified form).

6.5. Summary

We end the chapter by summarizing the results yielded by the studies in relation to the models, shown in Table 6.5.

Table 6.5. Summary of results.

Prediction	Support?	Model Supported
FG1 ≠ FG2	Yes	Model I, Model III
FG ≠ SG	No	Model I
Description-Choice correlation	Mostly weak correlations, strongest for SG2-Vertical	Model III

We can conclude that support for the Whorfian model is absent, while both the Mediation- and the thinking-for-speaking-models are supported. The following discussion will therefore leave out Model II and utilize Model I and III as possible explanations.

7. Discussion

This chapter attempts to interpret the results presented in Chapter 6 in order to render a coherent and plausible picture. The chapter ends with a theoretical summary.

7.1. Interpretations and Explanations

There are a number of interesting, although disparate, findings in our material. Let us however try to nail down the most interesting and prominent findings:

(i)   There were significant differences in categorization preference depending on task while independent of native tongue

(ii)   There were weak correlations between choice and description for the French groups. The most interesting are the correlation for FG2 when choosing Manner.

(i) There were no significant differences between languages in categorization preference; instead, there are significant differences between groups. This finding is very interesting, clearly suggesting an approach akin to (linguistic) mediation in order to explain this behavior. This significant difference is primarily manifested in the prominent Path-bias for FG2 and SG2, which is absent in FG1 and SG1. One possible interpretation is that the task of describing the situation requires a mode of thinking where we must conceptualize and analyze the motion situation. In other words, we must "frame" the motion situation linguistically in order to communicate the situation. In such an interpretation, it will not be this or that linguistic pattern that affects thought; instead, utilizing language in order to convey a reasonable understanding of the situation requires our thinking to center around more global factors such as Path, which has been independently suggested by Talmy (2000) to provide the "core schema" for motion events. On the other hand, when merely asked to choose on the basis of similarity we do not need to conduct such an analysis of the Figure and its surroundings – it might be enough just to identify the Manner of the motion as a "local" feature of the situation.

This could possibly explain why French and Swedish participants prove to have a prominent Path-bias when describing prior to choice. Since there are weak correlations between description and categorization, the explanation can equally well be some of the other mediational proposals listed in 5.3. For now this is an open question, but the fact that choosing yields a clear Manner-bias does support an explanation in terms of Semiotic Mediation.

(ii) We can see one difference between languages, albeit not strong enough to propose a

one-to-one relation between choice and description in the assumed mediated task for G2. The weak correlations between description and choice are for Manner in FG2. This might support the hypothesis of a "reversed relativity" in V-languages, put forward by Papafragou et al (2002) and discussed by Zlatev et al (in press). That is, speakers of French, a language constrained by boundary-crossing, might be biased towards Manner when it is expressed. Understood as such, the order of causation might be: *if* one expresses Manner in a V-language (likely in a separate clause due to the boundary-crossing constraint), then the semantic salience achieved can lead to foregrounding Manner in categorization as well. This might be the reason why FG2 displayed less of a Path-bias than SG2. The Swedes, which are not constrained by boundary-crossing, can express all relevant aspects of the motion situation with equal ease. Hence, the interpretation suggested in (i) applies overall to SG2.

7.2. Theoretical summary

The results do not conform to a unified interpretation in terms of linguistic influence, and the suggestion in Blomberg (2006) seems to be in need of some revision. One reasonable interpretation compatible with linguistic impact is still Semiotic Mediation; however, the role of linguistic influence in particular is still an open question. That is, it seems clear that the task of describing and choosing yields another categorization preference than just choosing does. This might be due to employment of language as such leads to an emphasis on the settings of the motion, thereby a preference towards Path/Direction over Manner. There were a number of significant correlations between descriptions and choices, above all for the Swedish groups, and mostly SG2. These were however not strong or consistent enough to support any prominent influence by the specific semantic categories used in the descriptions.

If one suggestion is to be put forward, based on the findings discussed in 7.1., it would be something of a synthesis between Vygotskean mediation and thinking-for-speaking. When in the task of describing prior to making the similarity choice, thinking in terms of global factors such as Path takes precedence over Figure-intrinsic aspects, such as Manner. On top of this, there might occur, due to specific linguistic constraints, some kind of language-specific influence, as shown in FG2. In other words, the task as such sets the mode of thinking in global factors. Still, our expression of the situation must be moulded according to the specific patterns of our native tongue, as suggested by Slobin (1996): language-specific patterns can be used to mediate thought to some extent.

The critique directed against thinking-for-speaking (2.4.1) could be overcome by explaining the need for linguistic impact in a Vygotskean fashion: language is used to mediate in particular

contexts and tasks. Thinking-for-speaking does however enhance the mediation-model by adding a possibility of interpreting language-specific patterns. This synthesis becomes theoretically solid insofar as the concepts of thought and language are clearly defined. Semiotic Mediation gives us an explanation as to why language influences thought and what kind of contexts will promote linguistic impact. On the other hand, thinking-for-speaking provides an analysis of language while further specifying which aspects of language are likely to yield a linguistic impact. However, further studies with more refined methodology and analysis must be conducted, studies which will hopefully provide us with more evidence so that we can continue to investigate this field where consensus is still far away.

8. Summary and Future Research

This chapter summarizes the thesis as a whole, attempting to extract the contributions made. Finally, some words will be said on how to continue studying the relation between language and thought.

Our study did not yield a homogenous picture of linguistic influence, though some correlations and significant relations were indeed found. There is however clear support for ruling out a "strong" version of Linguistic Relativity. It is still, from this material, an open question whether some other kind of linguistic influence exists.

I do believe that language and thought are, as stated at the beginning, woven together in an intricate manner. The purpose of writing this thesis, together with my Bachelor's thesis, was thus to further explore and elucidate such a conviction. Throughout this thesis, these goals have been accomplished. The apparatus suggested for classifying language-over-thought theories highlights one often neglected aspect: that models of language and thought differ in far more ways than in terms of the "strength" of the influence. I do hope that some clarity can be achieved by employing, if not this classification, then at least a similar approach. Following this classification, the empirical study seemed to some extent to support a synthesis of Semiotic Mediation and thinking-for-speaking. Such a model of linguistic impact is interesting in several ways: (a) there is at least some empirical support for it; (b) it goes beyond the classification in Chapter 2 by being language-general "with a hint of relativity"; (c) the concept of language as well as the concept of thought are clearly defined, and a plausible relation between them is suggested.

Another part of theoretical importance is the proposed taxonomy of motion situations. This field has all too long been filled with fuzzy definitions and somewhat arbitrary distinctions. Our taxonomy has several advantages and I hope that it can be applied to other languages, and even other domains than motion. The taxonomy can be used to generate new tools for testing linguistic influence on the categorization of motion.

This brings us, rather naturally, to the topic of future research. First, it is imperative to utilize other methodologies such as eye-tracking when conducting studies of this kind. As pointed out, we need to take more languages into consideration and analyze more closely the actual linguistic patterns used when speaking. It might also be interesting to test the material on (high-functioning) persons with autism since it has been suggested that they have an extreme form of thinking in linguistic terms. If we in such experiments could find an even stronger Path-bias, there is clear support for the model proposed in the last parts of this thesis.

Acknowledgments

First and foremost, I'd like to thank all of the French and Swedish people participating in the experiments. There wouldn't be much of a thesis without all of you!

Thanks to the nice people at *Max Planck Institute for Psycholinguistics* for letting us use and modify their excellent stimuli *Event Triads*.

I'd like to express my gratitude to Caroline David for her hospitality. As if that wasn't enough, all her help with conducting the experiment as well as transcribing and coding the utterances of the French participants was a great contribution to the thesis.

Joost van de Weijer was very helpful with the statistical analysis.

I owe a great deal to Anders Holmberg for developing software tools and for his "24-7 support hotline", which made it possible to conduct the experiment in the way we wanted.

Thanks to Andreas Lind for helpful comments and fruitful discussions and to David Westman for proofreading the thesis.

While not directly contributing, the works of scholars such as Ludwig Wittgenstein, John Lucy, Esa Itkonen and Willard van Orman Quine have served as a great inspiration to the author in times of intellectual crisis.

Finally, while typing these last lines of my Master's Thesis, I realize that none of it would have been possible without all the help and support from my supervisor, Jordan Zlatev. As I have stated elsewhere, my skills in language are insufficient in expressing how grateful I am.

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APPENDIX I: FORM OF CONSENT

Protocole d'accord

Vous vous êtes porté(e)s volontaire pour participer à une petite expérience linguistique qui dure environ 15 minutes. Cette expérience consiste à regarder un certain nombre de vidéo-clips: d'abord un vidéo-clip principal et ensuite deux autres. Une fois que vous les avez regardés, dites parmi les deux derniers celui qui ressemble le plus au premier vidéo-clip principal. Vous aurez trois exemples pour vous entraîner afin que vous compreniez ce que vous allez faire. On vous demandera aussi de décrire certains des vidéo-clips, et vous serez enregistré.

L'expérience est sans danger et il n'y a aucune "bonne" ou "mauvaise" réponse.

Les résultats de cette étude seront utilisés par Johan Blomberg, étudiant en DEA de Linguistique à l'Université de Lund en Suède, ils seront présentés dans des conférences et publiés dans des revues scientifiques. Aucune information personnelle à votre sujet ne sera divulguée ou utilisée. Cependant, les données recueillies (résultats et enregistrements) seront gardées sous forme codée et numérique afin qu'elles puissent être réutilisées ultérieurement, si besoin ait, pour de nouvelles recherches.

Si vous voulez vous retirer de l'expérience, vous êtes libre de le faire à n'importe quel moment, sans aucune conséquence. A la fin de l'expérience, vous serez informé des objectifs et des hypothèses de travail menés et recevrez 5 € pour vous remercier de votre participation.

Si vous avez des questions après l'expérience, envoyez s'il vous plait un e-mail à johan.blomberg.997@student.lu.se (en anglais) ou à caroline.david@univ-montp3.fr (en français).

Merci de votre participation

Caroline DAVID, Johan BLOMBERG and Jordan ZLATEV

Je soussigné(e)   _____   _____
                            Prénom   NOM

accepte de participer à l'expérience

Montpellier,
        _____   _____
                    date   signature

Ce formulaire a été signé en deux exemplaires

Form of Consent

You have been asked to participate in a small linguistic experiment, which takes approximately 15 minutes. The experiment involves watching a number of video-clips in groups of three and making the judgement which of two choices is most similar to the target clip. You will be given 3 practice examples, to understand better what you are to do. In addition, you will be asked to describe some of the clips, while being recorded.

The experiment in completely harmless and it is important to be aware that there is no "right" or "wrong" way of answering.

The results from the study will be used for Johan Blomberg's Master's Thesis in Linguistics at Lund University, Sweden and may be presented at conferences and published in scientific papers. No personal information about you will be published or otherwise used. However, your data and recording will be kept in a coded form to enable follow-ups and possible reanalysis of the material.

If you want to withdraw from the experiment, you are at any time free to do so, without any consequences. Upon completion of the experiment you will be informed about the goals and hypotheses of the experiment and receive 5 euros as thanks for your participation.

If you have any questions after the experiment, please send an e-mail to johan.blomberg.997@student.lu.se (in English) or to caroline.david@univ-montp3.fr (in French).

Thank you for your participation!

Caroline David, Johan Blomberg and Jordan Zlatev

I,

_____   _____
            (First name)   (Surname)

accept to participate in this experiment,

Montpellier**,** ....
                ....
              (date)   (signature)

This form has been signed in two copies.

APPENDIX II: Coding Sheet

CODING SHEET [PAGE 1 of 2]

Group 1 / 2 Subject 1 / 3 / 5 / 7 / 9 / 11
Ascending Order

Participant's Name: _____Age:_____ Gender: ____

Colour blindness: _____Other vision impairment:
_____

Education and literacy level:
_____

Knowledge of other languages:

_____

Participant's Brief Comments on the Task:

_____

	Point to LEFT clip?	**Point to RIGHT clip?**	**COMMENTS**
1 **2**			
3 **4**			
5 **6**			
7 **8**			
9			
10			
11 **12**			
13 **14**			
15 **16**			
17 **18**			
19 **20**			

Participant's Name: _____ Age:_____ Gender: _____

Colour blindness: _____Other vision impairment: _____
_____

Education and literacy level:
_____

Knowledge of other languages:

_____

Participant's Brief Comments on the Task:

_____

	Point to LEFT clip?	Point to RIGHT clip?	COMMENTS
20			
19			
18			
17			
16			
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10			
9			
8			
7			
6			
5			
4			
3			
2			
1			