Is the Object Standing, Lying or Sitting? A Study on Linguistic Relativity within the Domain of Posture Verbs in English and Dutch

Name:	Annemarie Walop
Student number:	s1021745
MA thesis supervisor:	Prof. A. Verhagen
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Table of contents:

Abstract

This MA thesis presents the results of a study which focused on ascertaining whether language influenced the way of thinking of English and Dutch respondents with respect to locating objects in space. Speakers of Dutch make use of three different cardinal posture verbs, *staan, liggen* and *zitten* (to stand, to lie and to sit, respectively) when locating inanimate objects in space, whereas speakers of English prefer to use the neutral verb *to be*. By means of a classification experiment and a memorization experiment it became clear that speakers of Dutch do not have a different way of thinking (e.g. classifying and remembering) about the objects due to their more diverse lexical field. This can be due to the fact that English and Dutch do not differ sufficiently in their use of posture verbs, as English does have the verbs *to stand, to lie* and *to sit* and does use these verbs for locating objects. It can also be because the use of the three different posture verbs has conventionalized in Dutch, causing the respondents to refrain from conceptualizing the position of the object. Thus, the language does not inspire any thoughts, which means that it cannot influence the speakers' way of thinking.

Keywords: linguistic relativity, posture verbs, Dutch, English, position, object, convention, conceptualization.

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List of tables and figures

Preface

While it sounds appealing to be able to choose your own topic for your thesis, it unfortunately also means that the possibilities are endless. Where to start looking for an interesting, researchable topic? I was fortunate to have taken a course called ‘Taal in gebruik’ (Language in use) in my previous semester, which turned out to be very interesting. Thus the general direction of research became clear to me relatively quickly: cognitive linguistics, the domain within linguistics which deals with language and thought. During the course, Lera Boroditsky and her research into the grammatical gender of words was briefly discussed, the results of which fascinated me. She investigated whether language, in this case the grammatical gender of words, could influence how people thought about objects. English and Dutch, however, do not distinguish grammatical gender as, for instance, German and Spanish do, so this particular topic was not researchable. The basic idea, however, of comparing two languages in some respect by means of experiments turned out to be viable. My supervisor told me that basically any difference between at least two languages can be investigated with respect to the idea of linguistic relativity. Several possible lexical differences between English and Dutch crossed the table. One of these lexical differences was the use of posture verbs, which was especially fascinating precisely because it had been investigated on a comparative linguistics level, but not on a linguistic relativity level. Thus, a research gap had been ascertained, and I could begin filling it. The results of my research can be read in this MA thesis.

Chapter 1: Introduction and Literature

1.1 Introduction

When thinking about the relevance of all research into linguistic relativity, a few things need to be considered. As Everett (2013) has noted, "speakers with a greater number of basic lexical items for a given semantic field construe that semantic field in more precise or discriminating ways than speakers lacking such terms" (16). When the linguistic relativity hypothesis is supported, it is important to know that it can have far-reaching consequences, for example in eyewitness testimony or in spatial orientation[1]. Any information that is gained with respect to how differences in language can foster differences in thought is important because it yields more insight into how people need to communicate with each other. Everett (2013) summarizes it as follows: "the understanding of radical and subtle relativistic effects can play a vital role in growing our understanding of the structure of human thought processes and in growing our understanding of the diversity of thought within our species" (270). In addition to providing valuable insights into how humans think and how thought differs depending on the language, research into linguistic relativity makes it possible to use the information which is gained in the communication between speakers of different languages. Many different domains and many different speakers can benefit from more research into linguistic relativity. However, it is important to note that not every linguistic difference produces a cognitive difference, meaning that much research focuses on establishing the extent of linguistic relativity rather than just the presence of it. As stated in the preface, this particular study will focus on gaining insight into the use of posture verbs in English and Dutch.

1.2 Research gaps

As can be read in section 1.5, many different domains and subdomains within languages have already been studied with respect to linguistic relativity. It has been proved (although not undisputedly) that linguistic relativity exists in the domains of space, time, quantities, colour, objects and substances and gender, amongst some other smaller subdomains. One subdomain within the domain of space that has not been investigated for linguistic relativity is that of posture verbs, which are used to locate an object in space.

The domain of posture verbs has been previously investigated by many researchers, including Van Oosten (1986), Newman (2002; 2009), Newman and Rice (2004), Lemmens

[1] For more on eyewitness testimony, see Slobin (2003).

and Perrez (2010; 2012) and Viberg (2013). These researchers have ascertained that there is a lexical difference in the use of posture verbs in English and Dutch. This has been achieved on the basis of linguistic comparison of the languages. However, there has been no research into whether a linguistic difference between languages can foster different ways of thinking about objects for speakers of the languages. More specifically the question is whether the differing use of posture verbs in English and Dutch results in a difference in thought about inanimate objects. Thus in this study, the linguistic information that was previously gathered will be used as a stepping stone to investigate the linguistic relativity theory by means of nonlinguistic experiments.

1.3 Research variables

The independent variable that is relevant to the present study is native language. There are only two options available for this variable: respondents have either Dutch or English as their native language. The languages English and Dutch were chosen because I master both languages enough to research them without needing additional help, and also because I could find enough respondents to fill out the questionnaire for both languages, which would have been difficult for any other language. The independent variable of native language will be offset against a dependent variable. For the classification task the dependent variable will be the number of times that respondents classified according to shape. For the memorization task the dependent variable will be the number of times the respondents were able to correctly identify the original picture.

1.4 Research question and hypotheses

Building on the theoretical background which is outlined in the next sections, the research question is formulated as follows:

Does the difference in posture verbs used for locating inanimate objects in English and Dutch influence speakers' ways of thinking about inanimate objects?

In other words, will speakers of Dutch, with its three cardinal posture verbs, be better at classifying and remembering the position of the displayed inanimate objects than speakers of English, with its sole preferred neutral verb? Holistically speaking, does the fact that a language has a more diverse lexical field mean that speakers of the language can better classify and remember the world around them?

In order to be able to answer this research question the following research hypotheses have been constructed:

1. Speakers of Dutch will significantly more often classify pictures according to spatial position than speakers of English.
2. Speakers of Dutch will be able to remember the position of objects in pictures significantly better than speakers of English.
3. From all of the mistakes that will be made, speakers of Dutch will make significantly less positional mistakes than speakers of English.

These research hypotheses will be tested by means of two research experiments, the theory behind which has been outlined in section 1.5.5. The next section will focus on providing a comprehensive outline of the linguistic relativity theory and of some research that has already been done on this subject.

1.5 Theoretical background

In this section the theoretical background of the study will be discussed, starting with the most holistic idea of language influencing thought, which was first formulated by Benjamin Lee Whorf and Edward Sapir. I will then move on to discussing the concept of 'thinking for speaking', which was proposed by Dan Slobin as an alternative formulation. Subsequently, I will summarize several studies which have tested the Sapir-Whorf hypothesis, both those that supported the hypothesis and those that contested it. Lastly, I will discuss similar experiments to those which are employed in this study and provide an overview of the rest of the paper.

1.5.1 Linguistic relativity

One of the most essential ideas within in the field of cognitive linguistics is the idea of linguistic relativity. Linguistic relativity, which is also called "the linguistic relativity hypothesis", "the Sapir-Whorf hypothesis" or the "Whorfian hypothesis", is a concept which was first formulated by Benjamin Lee Whorf and his teacher Edward Sapir in the 1930s. However, there are many scholars who have, at some point during their lives, noticed and called upon the connection between language and thought, including Plato, Kant (1798), Watson (1913), Wittgenstein (1922) and Humboldt (1836)(Everett 2013: 9). The present study will take the idea of linguistic relativity as formulated by Whorf as its outset.

In *Language, Thought and Reality* Whorf defines linguistic relativity as follows:

> "The phenomena of language are background phenomena, of which the talkers are unaware or, at most, dimly aware… These automatic, involuntary patterns of language are not the same for all men but are specific for each language and constitute the formalized side of the language, or its "grammar" … From this fact proceeds what I have called the "linguistic relativity principle", which means, in informal terms, that users of markedly different grammars are pointed in their grammars toward different types of observations and different evaluations of externally similar acts of observation, and hence are not equivalent as observers but must arrive at somewhat different views of the world." (1956: 282-3)

Or in other words: "…the idea that systematic differences across languages lead to differences in nonlinguistic cognition" (Everett 2013: 14). Whorf was the first to cohesively write down the set of ideas that constitutes linguistic relativism and to provide specific examples that supported his hypotheses (Everett 2013: 12). Over the years there has been a lot of criticism against Whorf, because it was thought that he advocated an extreme version of linguistic relativity, which held that thought could be equated with language and thus is completely governed by language (Whorf 1956: xi-xii). However, several scholars have argued against this, stating that Whorf's point was "that the way in which precepts [e.g. space and time] are organized conceptually, and thus given "meaning", relies crucially on language" (Whorf 1956: xi).

Since the 1990s there has been a surge in the number of scholars who have tested the linguistic relativity theory in some way. These scholars have proved that what Whorf hinted at, that concepts such as "space, time and matter are … affected by linguistic patterns", holds true (Everett 2013: 13). Linguistic relativity has been reported to exist in domains such as "space and motion, time, number (both grammatical and lexical), gender, mass/count distinctions, colour, and so forth (Boroditsky 2003; Wolff and Holmes 2010; Gentner and Goldin-Meadow 2003)" (Whorf 1956: xvii-xviii). However, there are also studies which have called into question the linguistic relativity theory, such as the one by Gleitman and Papafragou (2005). More on these studies can be found in section 1.5.4.

Lucy (1996) has differentiated between three distinct "levels" or "types" of relativity: "semiotic relativity", "structural relativity" and "discursive relativity". The first type of relativity proposes that "language in and of itself fundamentally alters the vision of the world held by humans in contrast to other species" (Lucy 1996: 39). The third type of relativity is more sociolinguistically oriented as it deals with the usage of language which influences the thought patterns of speakers of that language (Everett 2013: 33). Structural relativity is the type of relativity which is meant when researchers talk about linguistic relativity. It holds that

"characteristics of specific languages have an impact on the thought or behavior of those who speak them" (Lucy 1996: 41). This last type of relativity is the type which is being investigated in the present study.

On a higher level linguistic relativity contrasts with the idea of universalism, which is commonly attributed to Noam Chomsky. He claimed that "knowledge of language is based upon a core set of principles embodied in all languages and in the minds of all human beings" (Cook and Newson 2007: 8). Before the 1990s, the majority of the linguistic research was carried out among WEIRD (Western, Educated, Industrialized, Rich, and Democratic) populations, which led researchers to attribute specific language features to all languages. However, this assumption has slowly but surely been abandoned by the linguistic research that has been carried out from the 1990s onwards, which increasingly focused on all language families. Nowadays, researchers are experiencing increasing difficulty in reconciling their data "with beliefs of grammatical homogeneity at any meaningful level" (Everett 2013: 48). Section 1.5.3 will contain summaries of studies which have supported the idea of linguistic relativity and consequently simultaneously abandoned the idea of universality in language concepts.

1.5.2 Thinking for Speaking

Because the terms 'thought' and 'language' could be very broadly defined, Dan Slobin came up with the terms 'thinking' and 'speaking' as a replacement. "Static entities" were replaced with "dynamic entities", making it possible to define Thinking for Speaking as follows: "[it is] the expression of experience in linguistic terms" (Slobin 1996: 75-76). In other words, a speaker would fit their thoughts into the linguistic frames which are provided by the language, for purposes of efficient production. This all happens in the split second in which the speaker constructs their utterance (Slobin 1996: 76). Slobin (1996) concludes that a language does not provide us with a neutral coding system, by means of which one can describe an objective reality. It rather provides us with a subjective view of the world, which influences "the ways in which we think while we are speaking" (Slobin 1996: 91). By altering the terms, Slobin has facilitated a clear distinction between "linguistic and nonlinguistic thought", and this distinction now lies at the basis of much research into linguistic relativity, as can be read in the next section (Boroditsky et al. 2003: 62).

1.5.3 Research supporting the linguistic relativity hypothesis

As stated above there have been many scholars who have tested linguistic relativity since the 1990s. The accumulated empirical data has led an increasing number of researchers to believe that there is such a thing as linguistic relativity. It has been proved to exist in domains such as space, time, quantities, colour, objects and substances and gender, among other (sub)domains. This section will touch on each of these domains, providing brief summaries of a selection of research that has been carried out. Bear in mind that this section by no means provides an exhaustive summary of all the research that has been done within the domain of linguistic relativity.

Before moving on to a discussion on the domain of space it is important to note that the fact that there are linguistic differences between languages which influence how people think needs to be proven by having them carry out *nonlinguistic* tasks. Indeed, if those linguistic differences were only tested by means of linguistic tasks, one would only prove that there are differences in how languages describe the world, which is a truism that does not need any proving. The question rather is if these linguistic differences also affect the way people think about the world; a question which can only be answered by means of nonlinguistic experiments. The studies which are summarized below have tested the linguistic relativity hypothesis by means of nonlinguistic experiments, for instance classification and memorization tasks.

The domain of space deals with the way in which "systematic crosslinguistic differences in spatial language yield systematic disparities in nonlinguistic cognition associated with spatial reference and orientation" (Everett 2013: 72). One of the studies which has focused specifically on spatial topology is the one by Bowerman and Choi (2001), in which they carried out experiments with one-to-three year old English and Korean children. Both English and Korean employ certain spatial categories; Korean, for instance, broadly differentiates between putting things loosely or tightly together, not distinguishing containment ('in') from support ('on'), whereas English would use the verb 'put in' for both, ignoring the loose-tight distinction of Korean. The question was whether "the construal of spatial relationships of each of the two groups of children was more similar to the other group's construal, or more similar to that of the adult speakers of their own language" (Everett 2013: 78). Bowerman and Choi (2001) concluded that although the children might have started with a universal set of topological concepts, they are influenced by the linguistic categories of their own language before they can even speak (Everett 2013: 79). In other words, "children are sensitive to language-specific categorization principles from their earliest

productive uses of spatial forms, and at least in some cases in comprehension even before production begins" (Bowerman 2001: 505).

Another subdomain within the domain of space is the 'frame of reference' (FoR) domain. Brown and Levinson (1993) have conducted research among speakers of Tzeltal, who employ a different kind of spatial orientation than the relative (i.e. egocentric) orientation which is used in many languages. Because their land greatly differs in altitude, Tzeltal speakers use the terms "uphill" and "downhill" to refer to spatial positions (Levinson 1993: 66). Thus they make use of an absolute FoR rather than a relative FoR, which was long thought to be nonexistent. More recent research (Everett 2013; Levinson and Wilkins 2006) has shown that a distinction can be made between "relative", "absolute" and "intrinsic" orientations (Everett 2013: 80). Levinson (2003) concluded that speakers of Tzeltal had such a clear bias for the absolute system of reference in their nonlinguistic tasks because it was "engrained by the habitual linguistic reliance on the absolute FoR" (Everett 2013: 82). [2]

The domain of time has, amongst many others, been investigated by Sinha et al. (2011). One of the most important aims of their research was to provide evidence to "challenge the widespread assumption of the universality of linguistic mappings between space and time" (Sinha et al. 2011: 138). Many languages use spatial terms or metaphors when talking about time (e.g. the future is in front of you; the past is behind you; etc.). By looking at data from the Amazonian language Kawahib it became clear that the language has few nouns to describe time, for instance, there are no words for "time", "year", "month" or "week" (Everett 2013: 113). There are also few metaphors for describing time. On top of this, speakers of the language appeared not to think about time in a linear or cyclical manner (Everett 2013: 113). Speakers of Kawahib do not think of past events as being on the left on a continuous line and of future evens as being on the right on that same line, as speakers of many languages, including Dutch and English, do. Sinha et al. (2011) concluded that there is no universality with respect to temporal language being based on spatial nouns or metaphors (Sinha et al. 2011: 114).

However, Sinha et al. (2011) have only proved that there is no universal way of talking about time by means of nouns and metaphors of space. Casasanto et al. (2004) have tried to prove that people who speak languages which use different spatio-temporal metaphors also *think* about time in a different way (Casasanto et al. 2004: 575). Whereas much research has only employed linguistic tasks, it was their aim to support their hypothesis by means of

[2] Further information on linguistic relativity within the domain of space can be found in Levinson (1997), Pederson et al. (1998), Levinson et al. (2003), Haun et al. (2011), Le Guen (2011) and Danziger (2011).

nonlinguistic tasks only. Casasanto et al. (2004) tested two languages which employed the "time as distance" metaphor (English and Indonesian), which talks about time by means of a length analogy, e.g. 'long time' (Everett 2013: 125). They also tested two languages which employed the "time as quantity" metaphor (Greek and Spanish), which talks about time by means of a quantity analogy, e.g. 'much time' (Everett 2013: 125). The participants were shown a line for a duration of time, after which they had to indicate how long the line was or how long they were shown the line. Casasanto et al. (2004) found that the longer the line became, the longer the participants thought it had been displayed, and the shorter the line, the shorter it was thought to have been displayed. For English and Indonesian speakers there appeared to be a correlation between the length of the line and the time that they thought the line was displayed. For Spanish and Greek speakers there was no such space-on-time influence (Everett 2013: 126). The latter two groups of speakers did, however, show a correlation between quantity and time in a different experiment, in which they were shown a container which was filling with water for a particular amount of time. The more water there was in the container, the longer the participants thought they had seen the container. For the English and Indonesian participants no such quantity-on-time influence was detected (Everett 2013: 126). In their conclusion, Casasanto et al. (2004) state that "the particular languages that we speak can influence not only the representations we build for the purpose of speaking, but also the non-linguistic representations we build for remembering, acting on, and perhaps even perceiving the world around us" (Casasanto et al. 2004: 580). [3]

The domain of quantity, specifically that of numerals, has first been studied by Gordon (2004). He gathered data by testing the numerical cognition of people who speak Pirahã, a language spoken in Brazil, by means of eight experiments (Everett 2013: 151-2). In the "one-to-one matching task" the participants had to look at a number of stimuli presented in a line and then match the number of stimuli in their own line (Everett 2013: 152). The results for this easy task were fascinating, as it appeared that the Pirahã had increasing difficulty with this task when there were more than three stimuli presented. Indeed, the "magnitude of errors increased in proportion to the quantity tested" (Everett 2013: 153). Pirahã is an anumeric language, which means that it has no exact number terms, only approximates (i.e. the equivalent of the English "a few"). This led Gordon (2004) to conclude that "the Pirahã's impoverished counting system limits their ability to enumerate exact quantities when set sizes

[3] Further information on linguistic relativity with respect to the domain of time can be found in Boroditsky (2001), Gentner (2001), Gentner, Imai and Boroditsky (2002), Matlock, Ramscar and Boroditsky (2005), Núñes and Sweetser (2006), Boroditsky and Gaby (2010) and Miles, Nind and Macrae (2010).

exceed two or three items" (Gordon 2004: 498). Thus the linguistic relativity hypothesis has been proved to hold with respect to numeric language enabling numerical thought, and Everett (2013) even goes so far as to state that the research within the domain of quantity provides us with "one of the most radical kinds of linguistic relativity" (Everett 2013: 165).[4]

Research in the domain of colour long functioned as one of the principle arguments against the linguistic relativity theory. Berlin and Kay's (1969) seminal work was thought to offer convincing evidence for a universalist train of thought. More recent research, however, has tried to answer the question whether the linguistic variation which exists for languages impacts the nonlinguistic processing of colour terms (Everett 2013: 175). Davidoff, Davies and Roberson (1999) conducted an experiment among speakers of Berinmo, who distinguish five basic colour terms. Their word 'nol' denotes what in English would be denoted as 'blue' and 'green'. Their word 'wor' denotes what in English would be denoted as 'yellow' and 'green' (the lighter shades). The speakers had to memorize a chip of a particular colour and then select it from two alternates. Davidoff, Davies and Roberson (1999) found that Berinmo speakers had a greater recall ability when they were faced with two alternates that were from different linguistic categories (e.g. when the 'nol-wor' boundary was crossed). English speakers were found to have a greater recall ability when the English colour term boundary was crossed (e.g. when one alternate came from the 'green' and one from the 'blue' category). Thus, Davidoff et al. (1999) concluded that "disparate categorical effects in colour recall result from disparate lexical reifications of the colour spectrum", which meant that their results were in line with the linguistic relativity hypothesis (Everett 2013: 186; Davidoff et al. 1999: 203-4)[5].

Objects and substances constitute another domain within the field of linguistic relativity. Lucy (1992) has carried out research in this area by comparing how American English and Yucatec Maya mark number. In English, pluralization is obligatory, which means that for a large group of lexical nouns it is mandatory to mark whether a word is singular or plural. Yucatec speakers are obliged to mark singular or plural for only a small group of lexical nouns. However, they do have to mark unitization, which means that they "use a numeral classifier to indicate an appropriate unit" (Lucy 1992: 155). The speakers had to complete two types of tasks, classification tasks and memorization tasks, the results of which were in line with the two hypotheses that were formulated. English speakers did in fact focus

[4] The linguistic domain of quantity has been further investigated by Pica et al. (2004), Everett (2005), Frank et al. (2008) and Everett and Madora (2012).
[5] Further information on the linguistic domain of colour can be found in Davidoff, Davies and Roberson (2000), Roberson et al. (2005), Gilbert et al. (2006) and Winawer et al. (2007).

more on the number of various objects than Yucatec speakers, presumably because they obligatorily mark number on a wide array of objects. English speakers also focused more on the shape of certain objects where Yucatec speakers focused more on the material that the objects were made of, presumably because of their obligatory unitization (Lucy 1992: 156)[6].

Gender is the last domain that will be discussed in this paper, and it is simultaneously the domain for which linguistic relativity is most difficult to test. All research that has been carried out so far has in some way involved language, whereas it is vital that linguistic relativity is tested by means of nonlinguistic experiments. Everett (2011) is the most recent study which has tried to make use of language as little as possible. He tested English and Karitiâna speakers with respect to their 3rd person singular pronouns. In English these are gender-specific (he/she, him/her) whereas in Karitiâna they only use *i*. The speakers were shown short videos that portrayed abstract gender-ambiguous faces, after which they were asked what they had seen. Subsequently, they were asked to name the figure in the video. The results indicated that the use of the "epicene pronoun *i* foster[ed] relatively gender-ambiguous thought" and that English were significantly more likely to give masculine names to non-gendered figures (Everett 2013: 243). About the English use of pronouns Everett states that "the results are at least suggestive that the default usage of masculine 3rd person pronouns may bias English speakers' perceptions of non-gendered representations of human referents" (Everett 2013: 244). On the whole Everett (2013) concludes that "gendered language can prime or differentially induce certain kinds of thought", but that, crucially, it has not been proved that speakers of different languages think about gender in a different way in completely nonlinguistic environs, depending on their grammar (Everett 2013: 245).[7]

Other domains in which the linguistic relativity hypothesis is currently being investigated are the discourse domains of accident recall, emotion, counterfactual reasoning and action construal. Languages differ in the way they describe accidents and their cause. Fausey and Boroditsky (2010) have found that "agentively oriented language caused subjects to perceive a person as being more responsible for a given event" (Everett 2013: 249). Roberson and Davidoff (2000) and Roberson, Damjanovic and Pilling (2007) have concluded that "the linguistic labels of emotions impact the nonlinguistic perception of actual expressions" (Everett 2013: 254). A subtle variety of linguistic relativity can also be found in

[6] Further information on the linguistic domain of objects and substances can be found in Lucy and Gaskins (2001), Imai and Mazuka (2007) and Srinivasan (2010).
[7] More about linguistic relativity within the domain of gender can be found in Boroditsky, Schmidt and Phillips (2003), Vigliocco et al. (2005), Imai et al. (2010), Ramos and Roberson (2011), Belacchi and Cubelli (2011), Cubelli et al. (2011), Chen and Su (2011) and Saalbach, Imai and Schalk (2012).

the domain of counterfactual reasoning. Yeh and Gentner's (2005) results suggest that "linguistic factors impact counterfactual reasoning in some contexts" (Everett 2013: 258). And in the domain of action construal Everett (2012) found that his results "were consistent with a relativistic account" (Everett 2013: 263). All these domains, which are currently being researched, at the very least provide subtle evidence in favour of the linguistic relativity theory. In theory, where languages differ, this can possibly have an impact on people's nonlinguistic cognition. It can be concluded that some form of linguistic relativity can be found everywhere, one only has to investigate.

1.5.4 Research disputing the linguistic relativity hypothesis

Although there are many scholars who consider all the research that was summarized above to be enough to support the validity of the linguistic relativity hypothesis, there are still scholars who disagree about the interpretation of the research which has been carried out. Li and Gleitman (2002) have done research in the domain of spatial referencing, drawing on Pederson, Danziger, Wilkins, Levinson, Kita and Senft (1998), who tested Japanese and Dutch speakers by means of the *man and the tree test* and the *animals in a row test*. Li and Gleitman (2002) contest the idea that the "terminological distinction among languages influences spatial reasoning in a dramatic and straightforward way" and claim that the reverse is also possible, namely that "the culturally differing spatial reasoning strategies lead [the] groups to deploy different terminologies, those that are consistent with their reasoning" (Li and Gleitman 2002: 272). In order to test this hypothesis they carried out two experiments among one English-speaking linguistic community, while alternating the spatial contexts in which the experiments were carried out. For the *man and the tree test* the participants were paired up into groups of two, one of them was assigned the role of Director and the other the role of Matcher. The Director had to relay the order of fourteen photographs to the Matcher, who was seated on the other side of the table and separated from the Director by means of a screen. The results of the first experiment confirmed that English speakers use the relative or egocentric frame of reference (FoR) to describe objects that are in close proximity, even though they do have the terminology for the absolute or allocentric FoR (i.e. terms such as 'east', 'west', 'facing' etc.).

The second experiment made use of the *animals in a row test*, which was also used in Brown and Levinson (1993). For this experiment the participants had to look at three animals on a table, after which they were turned 180 degrees and asked to put the animals in the same order. This experiment was carried out in three different environments, in a laboratory room

with the blinds down, in a laboratory room with the blinds up, and outside on a patch of grass, and with varying landmarks on the experimental tabletop. Li and Gleitman (2002) concluded that their English participants behaved much the same way as the Dutch participants did in the original study, provided that the blinds in the laboratory room were down. In other words, "speakers of a language community that favors "relative" egocentric terminology overwhelmingly chose the body-centered solution of the tabletop spatial task" (Li and Gleitman 2002: 279). For this task only a small number of the participants was puzzled by the ambiguity of the task, and asked the experimenter for an explanation (20% of the participants). However, when the experiment was carried out with the blinds up or outdoors, thus in "landmark-rich contexts", Li and Gleitman (2002) found that "about half the subjects in each manipulation now opted for the egocentric ("relative") solution and half for the allocentric ("absolute") solution" (Li and Gleitman 2002: 280). An increasing number of participants now noticed the ambiguity of the task and asked for clarification (70% of the participants).

Another variation on the experiment was the placement of a landmark cue on the experimental tabletop, in the form of a styrofoam duck. For one half of the participants, the egocentrically-biased group, the duck was placed on the right side of the subject on both tables. For the other half of the participants, the allocentrically-biased group, the duck was placed on the south side of both tables. Li and Gleitman (2002) state that "the subjects' problem is to decide which side of the second table corresponds to a given side of the first table" and that "the placement of the … duck trivially directs this choice within the frame of reference of the tabletop itself" (Li and Gleitman 2002: 282).

Based on the results Li and Gleitman (2002) obtained from these experiments, they conclude the following:

> "So far we have seen that the relative/absolute strategies for the rotation task can be reproduced within a single language community. This tends to vitiate the claim that specific language features ... are the underlying cause, or the sole underlying cause, of the original effects... As we showed, the monolingual subjects solved this task differently depending on the presence and strength of the landmark cues made available to them" (Li and Gleitman 2002: 282)

They go on to nuance their conclusion by stating that "it is certainly possible to suppose that, while landmark cues are variables that materially influence spatial reasoning, so are language variables such as the "habit" or "practice" of saying west rather than saying left" (Li and Gleitman 2002: 283). In order to fully ascertain that language has nothing to do with the

choice of FoR, they propose to carry out experiments among groups that do not use language: animals and prelinguistic human infants. The infants showed an egocentric orientation in the laboratory and the unfamiliar, landmark-rich environment. In their familiar home environments, however, the infants showed an overwhelmingly absolute orientation. Li and Gleitman (2002) conclude that "rodents and human infants solve spatial rotation problems differently depending on the availability and salience of landmark cues" (Li and Gleitman 2002: 285). These results led them to turn the relativity theory 180 degrees around, and posit that "linguistic systems are merely the formal and expressive medium that speakers devise to describe their mental representations and manipulations of their reference world" (Li and Gleitman 2002: 290). Thus, it is not language which enables certain thoughts, but it is the thoughts that are represented by the language.

Li et al. (2011) elaborate on Li and Gleitman (2002) in one particular methodological respect, namely that of the rotation task. Whereas previous rotation task based studies have always left the task ambiguous, meaning that participants could choose either FoR and still provide a correct response, Li et al. (2011) created rotation task which had only one correct answer. This way they tested the ability of geocentrically-oriented language speakers to employ egocentrically-oriented language in the solution of the tasks. Li et al. (2011) showed that speakers of a geocentrically-oriented language did equally well in solving egocentric spatial problems as they did in geocentric problems, and that when task complexity increased, the performance levels of geocentric spatial problems plummeted, whereas the performance levels of egocentric spatial problems remained the same. This led them to conclude that "spatial reasoning is flexible and largely independent of the implied dictates of linguistic encoding", and that " the linguistic encoding of spatial FoRs vastly underrepresents people's ability to think about where objects are located and how they move through space" (Li et al. 2011: 51).

In sum, those arguing against the linguistic relativity hypothesis state that "language is more effect than cause of our thought; … that we talk the way we think" (Li et al. 2011: 51). Their basic idea is that "owing to the differences in the circumstances that populations find themselves in, they invent and use lexical and grammatical resources that most conveniently express these circumstances" (Li et al. 2011: 51). Thus it makes sense that when environments change from unfamiliar to familiar for example, or when given a task with only one possible solution, populations adapt their behaviour/language to suit their thoughts in the present situation.

A different view on linguistic relativity has been offered by Croft (2001), who calls into question the saliency of the linguistic relativity hypothesis when taking conventionalization into account. Croft (2001) proposes that when a language has only one way of expressing for example the "bodily state" *I am hungry*, then that is "the conventional way to express this experience" (Croft 2001: 111). This means that it is possible that "the conventional expression" does not encode "any particular conceptualization … for the speakers of the language" (Croft 2001: 112). If this is the case, Croft (2001) concludes that it is "likely that speakers of different languages represent similar experiences in similar ways, despite differences in the conventional linguistic expression of those experiences" (Croft 2001: 112). In other words, if a language has only one way of saying something – the conventional way – speakers might not conceptualize the expression. This is crucial when investigating linguistic relativity, because then language cannot be said to influence thought.

Aside from the interpretations of researchers in favour of or against the linguistic relativity theory, there are those who have come up with a third possible interpretation of the research. Gleitman and Papafragou (2012) posit that the findings can be explained as a "language-on-language" effect, which holds that "language-specific patterns of cognitive performance are a product of the online language processing that occurs during problem solving" (Gleitman and Papafragou 2012: 19). Even in nonlinguistic tasks, such as the rotation task, there is some linguistic intrusion, for instance in the task instruction. The phrase 'make it the same' might have different meanings in different languages, and thus influence how the participants interpret the assignment. On top of this, it is a fact that humans like to use language "to represent and store information", thus they make use of language while trying to understand what they are expected to do (Gleitman and Papafragou 2012: 19). Gleitman and Papafragou (2012) conclude by stating that this online use of language "offers an alternative, efficient system of encoding, organizing and remembering experience" (Gleitman and Papafragou 2012: 20). Even in a nonlinguistic task, language is inevitably going to be involved in some way.

The debate about the validity of the linguistic relativity hypothesis is still ongoing, and will continue to go on in the near future. One side will claim that language shapes thought and the other will claim that thought shapes language, and maybe in the end it will turn out to be a chicken-egg situation. In any case there are still many domains and subdomains for which the linguistic relativity hypothesis can be investigated.

1.5.5 Research experiments

Two research experiments were carried out for this study. The respondents first had to do a classification task and then a memorization task, both of which are described in full detail in section 2.4. This section will provide some background information as to the two tasks the respondents had to complete. It is important to note that both tasks were entirely nonlinguistic, meaning that the respondents did not have to answer questions using language. There are four basic functions which can be investigated when thinking about how language influences thought: interpretation, remembrance, manipulation and decision (Lucy 1992: 91). In the present study, two of these basic functions, interpretation and remembrance, are tested by means of two experimental tasks. The classification task is also called the "object task" by Lucy (1992) because it was performed with real-life objects, instead of with pictures of objects as in this study (Lucy 1992: 136). The classification task addresses the basic function of interpretation, as it asks the respondents to group two objects together on some basis, which means that they have to interpret what they are shown and act on this interpretation. The memorization task is also called "nonverbal recognition memory I (shorter term)" by Lucy (1992) because it is followed by a memorization task which tests the respondents' long-term memory (Lucy 1992: 122). The memorization task addresses the basic function of remembrance, as it asks the respondents to select the original picture from an array of pictures after a short period of distraction. In the next section, I will provide some theory as to the lexical coding of posture verbs in Dutch and English, which will serve as the backbone to the present study.

1.6 The domain of posture verbs

One of the domains that still needs investigating is that of Dutch posture verbs *staan* (to stand), *liggen* (to lie) and *zitten* (to sit). The first step in the research into linguistic relativity is the identification of "a difference between languages, in sound, word or structure" (Gleitman and Papafragou 2012: 19). The Dutch language distinguishes between three cardinal posture verbs to indicate in which position a certain animate or inanimate object is at a particular time. The English language, however, does not usually divide the lexical field into three different verbs. Instead, it prefers the use of only one verb, *to be*, to locate objects. In this section, both the Dutch and the English way of locating objects by means of posture verbs will be discussed.

1.6.1 Dutch *staan* (to stand), *liggen* (to lie) and *zitten* (to sit)

It is necessary to provide an overview of how the Dutch use their posture verbs. On the whole, three types of usage can be distinguished: "postural", "locational" and "metaphorical", the latter of which will not be discussed in the present paper, as it falls outside the scope of this research (Lemmens 2010: 318). The three different posture verbs will be subsequently discussed below.

Staan (to stand)

The default or "canonical" posture of human beings is upright, standing (Oosten 1986: 144). Lemmens and Perrez (2010) provide a schema which summarizes the uses of *staan* in Dutch as follows:

> "(i) Be on one's feet -> be on one's base
> (ii) Extend upwards from base (origin) -> extend from origin in any direction
> (iii) Have a vertical orientation (absence of base or not on base)
> (iv) Be in canonical position
> (v) Written text as standing" (Lemmens and Perrez 2010: 318-9)

The first principle which is outlined is the leading principle with respect to denoting position. Lemmens and Perrez (2012) state that "for *staan*, the basic key to its usage is whether the entity in question has legs or a base… if the located entity has a side on which it rests when it is in its canonical and/or functional position, *staan* is to be used, regardless of the entity's verticality" (Lemmens and Perrez 2012: 4). The fifth principle is more concerned with metaphorical language, so it will not be discussed here. The following sentences are examples of the four remaining uses of *staan*. Notice that most of the sentences portray more than only one of the principles outlined above.

(1) Er staat een man voor de deur.
    Lit. There is a man (standing) in front of the door.
(2) Het bord staat in de slaapkamer.
    Lit. The plate is (standing) in the bedroom.
(3) Het boek staat op de kast.
    Lit. The book is (standing) on the closet.
(4) Het glas staat op tafel.
    Lit. The glass is (standing) on the table.

Sentence (1) is about a human being who is on his legs/feet, or in other words, on his base. On top of this, the human extends upwards from his base, which are his feet, has a vertical

orientation and is in his canonical position. All of these point towards the correct usage of the verb *staan*. Sentence (2) contains an object with a clear base – the bottom of the plate. In this case, the object extends horizontally from its base. Even though horizontality usually points towards the use of the verb *liggen*, it does not here, precisely because the principle of the object having a base on which it stands is more salient. The use of the verb *staan* also yields information of the functionality of the object in its current position, meaning that *staan* is used for objects in their functional position. The object in sentence (3) does not have a clear base, nor does it have a canonical position, which means that another principle has to be met with in order to justify the use of the verb *staan*. The remaining principle holds that the object must have a vertical orientation in order to be standing. Van Oosten (1986) also mentions that "[the book] is taller than it is wide and has enough rigidity to support itself" (Van Oosten 1986: 145). The use of the verb *staan* in sentence (4) can be justified by means of the fourth principle: the glass is in its canonical or functional position. In addition, it is on its base and extending upwards, even though it does not necessarily have a vertical orientation.

Liggen (to lie)

The verb *liggen* is used in the following cases:

> "(i) Be on one's sides (human posture), not be on base with horizontal orientation (inanimate entities), not be on one's base (regardless of orientation)
> (ii) Location of dimension-less entities
> (iii) Geotopographical location (cities, buildings, etc.)
> (iv) Location of abstract entities" (Lemmens 2010: 322)

Liggen is the verb which is directly contrasted with and the complete opposite of *staan*. Thus its leading principle is that the object is *not* on its base. Van Oosten (1986) notes that "lying down is not the canonical position of a human being", that "a human being lying down is considerable longer than high", and that "human beings lying down … do not have to and even cannot physically support themselves" (Van Oosten 1986: 144). The following sentences exemplify the use of *liggen*:

(5) De kleren liggen in de kast.
Lit. The clothes are (lying) in the closet.
(6) De bal ligt op de stoep.
Lit. The ball is (lying) on the pavement.
(7) De kerk ligt aan het plein.
Lit. The church is (lying) at the square.

(8) De waarheid ligt in het midden.
Lit. The truth is (lying) in the middle.

Sentence (5) contains a non-rigid entity, which means that the object does not have the strength to hold itself up in a standing position. Lemmens and Perrez (2012) add that "unless constrained by some container, these [kind of] entities automatically take a horizontal extension under the forces of gravity" (Lemmens and Perrez 2012: 5). Clothes do not have a clear base, but when put neatly into a closet, they do have a horizontal orientation. Sentence (6) is an example of principle (ii), in that the dimension-less entity, in this case a ball, is lying on a ground. A ball does not have a base, so it cannot *not* be on its base. Lemmens and Perrez (2010) state that "the verb *liggen* [was conventionalized] to encode the location of symmetrical entities" (Lemmens and Perrez 2012: 323). A geotopographical location such as the church in sentence (7) is always referred to by means of the verb *liggen*. This is the case even when standing right in front of the building and seeing that the building itself has a clear vertical orientation. Because the sentence does not refer to the building itself, but to the geographical location of the building. In sentence (8) an abstract entity such as truth is given a location. The entity is abstract because no image comes to mind which would help to determine the horizontality or verticality of the entity. Thus, Lemmens (2010) concludes that the verb *liggen* is used for "encoding abstract entities" (Lemmens 2010: 323).

Zitten (to sit)

The verb *zitten* cannot be as closely defined as the other two verbs, because it is a state of being in-between. Lemmens and Perrez (2010) come up with the following uses:

> "(i) Be in a sitting posture (considerable postural variation), default posture of small animals, default posture of insects
> (ii) (Close) containment (locational usage)
> (iii) (Close) contact (locational usage)" (Lemmens and Perrez 2010: 324)

Horizontality and verticality do not come into play for *zitten*, as *zitten* can be said to be half of both. Interestingly, *zitten* is very diversely used. For instance, there are myriad ways in which a human can be in a sitting position. In the second use, also called "containment-*zitten*", the verb no longer defines a certain position, but it "situates the entity as (closely) contained by a container" (Lemmens 2010: 324). The closeness of the containment has become increasingly relevant, as "the larger the container *vis-à-vis* the entity contained, the more likely it is that the

position of the latter will determine which verb is to be used" (Lemmens 2012: 5). The following sentences show how *zitten* is used in Dutch:

(9) De man zit op een stoel.
Lit. The man is (sitting) on a chair.
(10) De fles zit in mijn tas.
Lit. The bottle is (sitting) in my bag.
(11) De boter zit in de koelkast.
Lit. The butter is (sitting) in the fridge.
(12) De sticker zit op de appel.
Lit. The sticker is (sitting) on the apple.

One way of being in a sitting posture is while sitting on a chair, which is the case in sentence (9). In sentence (10) the bottle is contained within a bag, so the verb *zitten* is used, even though the bottle may very well be in a lying position within the bag. Containment-*zitten* is thus more important than the actual position of the entity that is in containment. This is also the case for sentence (11), in which the butter is contained within the fridge. The sentences *'De boter staat in de koelkast'* (The butter is (standing) in the fridge) and *'De boter ligt in de koelkast'* (The butter is (lying) in the fridge) are both grammatical. The first either means that the butter is standing on its side and extending upwards, thus having a vertical orientation, or it means that the butter is on some kind of dish which has a clear base on which it is standing. The latter sentence means that the butter is on its largest side, making the butter wider than it is high, thus more horizontally oriented. The container in sentence (11) is bigger than the one in sentence (10), which makes it possible that the position of the entity in the container suddenly becomes more important than the fact that the entity is contained. Sentences such as *'De fles staat in de tas*' (The bottle is (standing) in the bag) and *'De fles ligt in de tas'* (The bottle is (lying) in the bag), although not ungrammatical, will certainly be used less often than sentence (10). Sentence (12) exemplifies contact-*zitten*, as the sticker is in very close contact with the apple.

1.6.2 English posture verbs and neutral *to be*

This section will be limited to the use of posture verbs in English in posture-based locational expressions about objects, thus it will leave out any grammaticalized extensions and metaphorical usages, as well as locational expressions pertaining to humans. Newman (2002) states that "languages differ in the extent to which the posture verbs can be extended to non-human referents... While English can utilize the posture verbs to refer to non-humans, their

use in such expressions is limited" (Newman 2002: 7). This is because unlike other Germanic languages, English prefers the use of a neutral verb, usually a verb of existence like *to be*, in locative expressions (Lemmens 2012: 3). However, this does not mean that the basic cardinal posture verbs are not at all used in English. Here are some sentences about inanimate objects that contain the verb *to sit*, taken from Newman (2002):

(13) "The computer sits on a desk at home.
(14) The car is sitting in the garage.
(15) Our house sits (snugly) between two adjoining ones.
(16) ?The mattress is sitting on the floor." (Newman 2002: 7)

Newman (2002) identifies two different extensions to the verb 'to sit', namely "non-activity sit" and "good-fit sit" (Newman 2002: 18-9). Sentences (13), (14) and (16) are examples of non-activity sit, because they indicate that a certain object has been at that place for a long time without being used. In this respect, sentence (16) is correct, but if one only wants to indicate the position of the object, then the verb *lying* would have been correct, due to the horizontal orientation of the object. Sentence (15) is an example of good-fit sit, as it contains an object which is placed tightly in between two other objects. The shape of the object, in this case a house, is not taken into account because the other feature, the good-fit, is more salient. The sentences below exemplify the use of the verb *to stand* for inanimate objects:

(17) "The statue stands on the piano.
(18) The chair stands next to the window." (Newman 2002: 8)

When the object has a clear vertical orientation or a base, as a statue does, or it has legs, as a chair does, the verb *to stand* is correctly used. Sentences (19) and (20) below, taken from Newman (2002), contain the verb *to lie*.

(19) "The clothes are lying on the floor.
(20) ?The vase lies on the piano." (Newman 2002: 9)

The object in sentence (19) has a clear horizontal orientation, thus the verb 'to lie' is used. Newman (2002) states that "where it is contextually relevant to draw attention to the spatial orientation of the entity being located, the posture verbs prove useful" (Newman 2002: 9). This is the case for sentence (20), in which the horizontal orientation of the object is being differentiated from the default vertical orientation of said object.

Even though sentences (17-20) are grammatically correct, intuitively, something feels off. Van Oosten (1986) notes that "it is not necessary to specify orientation in English

expressions of locations, and sometimes it is even preferable not to" (Van Oosten 1986: 138). She provides the following examples, in which the bold-faced words are preferred:

(21) A. "**There is a lamp** (standing) **in the corner**.
B. **The book is** (lying) **on the table**.
C. **The book is** (standing) **on a shelf**.
D. **The clothes are** (lying) **in the drawer**." (Van Oosten 1986: 138)

In the sentences in (21) either a form of the verb *to be* or the present progressive (continuous) form of the posture verb is required to make the sentence grammatical. The latter makes the sentence more detailed, as it exactly specifies in which position the object is. Newman (2002) adds that "English does not require [such] degree of specificity when referring to the location of an object" and in fact, the sentences with the verb *to be* are "more colloquial" (Newman 2002: 9-10). Notice that sentences such as (22a), in which the present simple of the posture verb is used, are not grammatical. Sentence (22b) like sentence (20), although strictly speaking they are grammatical, are certainly not preferred.

(22) A. *There stands a lamp in the corner.
B. ?The book lies on the table.

The following sentences show how Dutch prefers the use of posture verbs above the use of a neutral verb such as *zijn* (to be):

(23) A. "**Er staat**/is **een lamp in de hoek**.
B. **Het boek ligt**/is **op de tafel**.
C. **Het boek staat**/is **op de tafel**.
D. **De kleren liggen**/zijn **in de la**." (Van Oosten 1986: 138)

Again, strictly speaking the use of the neutral verb *zijn* is not ungrammatical, it is less idiomatic.

1.6.3 Conclusion

The three Dutch posture verbs *staan, liggen* and *zitten* are used in many diverse senses. Although the same three posture verbs do occur in English sentences, their use is limited when compared to Dutch. Furthermore, where in Dutch it is preferred to specify location as exactly as possible, in English this not necessary. Thus the preferred way of locating objects in English and Dutch is completely opposite, which is shown in how both languages are classified with respect to posture verbs. Where Dutch is classified as a "Type II" language, which has "a small contrastive set of locative verbs", English can be classified as a "Type I" language, which has only "a single locative verb" (Ameka and Levinson 2007: 863-4). Thus

there is an identified lexical difference between English and Dutch within the domain of posture verbs, which will be the focus of the present study.

1.7 Thesis overview

This chapter has been concerned with providing a comprehensive framework of theory on which the present study will build. It has stated the research question and hypotheses, as well as the relevance and possible use of the present study. The next chapter will yield a detailed outline of the methodology that was used to obtain the results. The outline will include a description of the material which has been used in this study, a characterization of the respondents that have filled out the questionnaire, an explanation of the examination procedure and an in-depth report about the questionnaire itself. Chapter 3 will separately list the results which have been obtained for the classification task and the memorization task, after which those results will be discussed and embedded within the body of previous literature in chapter 4. The entire study will be summarized and concluded in the final chapter, which will also include limitations of the present study and suggestions for further research.

Chapter 2: Method

2.1 Introduction

In this chapter I will outline the methodology that was used for the present study. First the material that was used for both the classification and the memorization task will be described in detail. Then there will be more information given about the respondents that filled out the questionnaire. Section 2.4 will recount the procedure that was followed by the respondents while filling out the questionnaire. The final section of this chapter will give a comprehensive report on the questionnaire itself, including the pilot questionnaire that was carried out. The entire questionnaire including the picture stimuli can be found in Appendix 2.

2.2 Material

This section will provide more information on the material that has been used in this research. All the pictures were taken with a digital camera by myself for the purpose of this study.

2.2.1 Picture stimuli classification task

In this section there will be more information provided on the material that was used for the similarity judgement or classification task. The stimuli for this task consisted of 28 sets of three pictures of inanimate physical objects. All the items that were used for this research were normal everyday items for both English and Dutch people. Each picture contained one or more items, or 'figures', on a certain 'ground' and in a certain position. The pictures were very carefully composed, so as to make them as clearly different as possible, meaning that the grounds and the figures that were used were selected specifically to avoid ambiguity. The pictures were all taken approximately from the same distance and angle in order to create a homogenous environment in the background of the objects.

Each triad consisted of one original picture and two alternate pictures. For example, one of the triads had a bottle standing on the floor as the original picture (see figure 1). The first alternate picture was a bottle lying on the floor and the second alternate picture showed a bottle standing on the table. Classification of pictures can be done based on different "attributes" of the picture, for instance, type of figure, type of ground and position (Lucy 1992: 137). The original picture in each of the triads contained two such attributes, while both alternates only contained one of these attributes. In the example above the original picture showed a bottle standing on the floor. Thus the two attributes of this picture were the position of the figure, in this case standing, and the ground on which the figure rested, in this case the floor. Alternate picture 1 showed the same figure on the same ground, but in a different

position, namely lying. Alternate picture 2 showed the same figure in the same position, but on a different ground. Thus each alternate picture differed from the original in only one respect, because all the other attributes, such as type of figure, number, material etc., were kept constant. This forced the participants to classify the pictures according to a maximum of two different bases for classification.

Figure 1: Picture triad

By means of the twenty triads the relative salience of the different bases for classification were addressed. The first ten triads, which are listed in table 1, involved a direct contrast between position and ground as possible bases for classification. The original picture portrayed an object that was in a certain position and on a certain ground. Alternate picture 1 showed the same figure on the same ground, but in a different position. Alternate picture 2 showed the same figure in the same position, but on a different ground than the original. The participants were then asked which of the two alternate pictures looked most like the original. This experiment tested whether English and Dutch participants classified the pictures according to position or ground.

Table 1. *Triad sets used to directly contrast position and ground as bases for classification*			
Triad	*Original*	*Position alternate*	*Ground alternate*

number			
1.1	Bottle standing on floor	Bottle lying on floor	Bottle standing on table
1.2	Plate standing on table	Plate lying on table	Plate standing on couch
1.3	Stapler standing on countertop	Stapler lying on countertop	Stapler standing on couch
1.4	Desk lamp standing on table	Desk lamp lying on table	Desk lamp standing on couch
1.5	Book lying on shelf	Book standing on shelf	Book lying on table
1.6	Cup lying on table	Cup standing on table	Cup lying on floor
1.7	Bag of pasta lying on floor	Bag of pasta standing on floor	Bag of pasta lying on shelf
1.8	Statuette lying on countertop	Statuette standing on countertop	Statuette lying on floor
1.9	Tomato sitting in box	Tomato lying on box	Tomato sitting in plastic bag
1.10	Bead sitting in plastic bag	Bead lying on plastic bag	Bead sitting in glass

Four out of these ten triads had ‘standing’ as their original position and four had ‘lying’. This was done in order to determine that participants were not grouping the pictures together on the basis of functionality, as the two objects in a ‘standing’ position were also functional in that position. Thus in four cases, two objects would be in dysfunctional position and one in a functional position, making it impossible to classify according to functionality. Of the ten triads, the ones that had ‘sitting’ as their initial position (e.g. 1.9 and 1.10) were most difficult to construct. This is because the ground in the original picture and the first alternative are not completely the same. Even though it is a box or a plastic bag in both pictures, the prepositions *in* and *on* indicate that there is a slight difference with respect to the ground. This difference could unfortunately not be avoided. The above triads were considered extremely relevant in supporting or disputing the research hypothesis that the two different target groups would actually classify the pictures according to different attributes.

Table 2. *Triad sets used to directly contrast position and figure as bases for classification*

Triad number	*Original*	*Position alternate*	*Figure alternate*
2.1	Bottle standing on table	Bottle lying on table	Book standing on table
2.2	Plate standing on table	Plate lying on table	Cup standing on table
2.3	Stapler standing on table	Stapler lying on table	Bag of pasta standing on table
2.4	Desk lamp standing on table	Desk lamp lying on table	Statuette standing on table
2.5	Book lying on table	Book standing on table	Plate lying on table
2.6	Cup lying on table	Cup standing on table	Stapler lying on table

2.7	Bag of pasta lying on table	Bag of pasta standing on table	Desk lamp lying on table
2.8	Statuette lying on table	Statuette standing on table	Bottle lying on table
2.9	CD sitting in cover on table	CD lying without cover on table	Key sitting in keyhole on table
2.10	Bottle sitting in bag on table	Bottle lying on bag on table	Little bear sitting on bag on table

Table 2 contains all the triads that had position and figure, or type of object, as alternate attributes on which basis a classification could be made. The original picture portrayed a certain figure in a certain position on a set ground, a table. Alternate picture 1 showed the same figure in a different position on a table. Alternate picture 2 showed a different figure in the same position as the original on a table. Again, the goal of the experiment was to ascertain how the participants would classify the pictures when asked which alternate picture was most like the original.

As with the triads that were concerned with position and ground, these ten triads contained four that showed the original picture in a 'standing' position and four in a 'lying' position. Two out of the ten triads showed the original object in a 'sitting' position, which was again the most difficult position for which to construct valid triads.

Table 3. *Triad sets, used for the distraction of the participants, contrasting two out of the following four bases for classification: colour, figure, number and material*

Triad number	*Original*	*Alternate 1*	*Alternate 2*
		Colour	Figure
3.1.1	Blue glass	See-through glass	Blue plate
		Colour	Number
3.2.1	2 silver spoons	1 silver fork	2 see-through cups
3.2.2	1 white paper	2 white plates	1 see-through cup
		Number	Figure
3.3.1	3 cups	3 spoons	1 see-through cup
		Number	Material
3.4.1	2 silver knives	2 wooden spoons	1 silver fork
3.4.2	2 plastic bowls	2 porcelain plates	1 plastic cup
		Material	Colour
3.5.1	White paper	Coloured paper	White plate
		Material	Figure
3.6.1	Porcelain cup	Porcelain plate	Glass cup

Eight triads were constructed to serve as distractors, so that the participants would not be able to guess that the questionnaire was about position. It was of paramount importance that the task would be exactly the same as for the other triads, which meant that it had to be a

classification task, only on different bases. Colour, number, material and figure (shape) were chosen as alternate bases for classification, because these have been used as bases for classification in other studies (e.g. Lucy 1992).

Colour was contrasted with figure in set 3.1, with number in set 3.2 and with material in set 3.5. Number was pitted against figure in set 3.3, and against material in set 3.4. Lastly, material was set against figure in set 3.6. As can be seen in the table, 'number' refers to a specific number, for instance two or three, and not to the one versus many distinction.

2.2.2 Picture stimuli memorization task

The stimuli for the memorization task consisted of pictures which were specifically taken so as to include different positions, figures, numbers, colours, materials and grounds. The objects that were photographed were equally accessible to both the English and the Dutch target group, as they were objects frequently used in a familiar domestic sphere. When the pictures were taken, it was made sure that all of the objects were clearly visible and that they were unambiguously in a certain position.

Three sets of stimuli were produced that increased the level of difficulty. This was done in order to ascertain what level of difficulty would yield the most information that could be used for the research. The pictures in set 1 contained only one type of figure, the pictures in set 2 contained two types of figures and the pictures in set 3 contained three types of figures. It was assumed that the more different objects there were in the picture, the more difficult it would be for the participant to remember all the salient attributes in the picture correctly.

Table 4. *Sets of pictures containing one original picture and five alternate pictures, which contrast with the original picture on one or several of these bases: position, number, material, colour, figure and ground*

	Original	*Alternate 1*	*Alternate 2*	*Alternate 3*	*Alternate 4*	*Alternate 5*
1.1	1 white cup lying on table	1 white cup standing on table	1 blue cup standing on table	1 white cup lying on floor	1 white cup lying on couch	2 white cups standing on table
1.2	1 white plate standing on table	1 brown plate standing on table	1 white/purple plate lying on couch	1 white plate lying on table	1 white dinner plate standing on table	2 white plates standing on table
2.1	1 green bottle of wine and three	1 green bottle of beer and three	1 green bottle of wine standing and three spoons	1 green bottle of wine standing	1 green bottle of beer standing	1 green bottle of wine standing

	spoons lying on table	spoons lying on table	lying on table	and two spoons on table	and three spoons lying on table	and three spoons lying on couch
2.2	1 stapler, 1 cup standing on table	1 stapler lying, 1 cup standing on table	1 stapler standing, 1 cup lying on table	1 stapler, 2 cups standing on table	1 stapler, 1 blue cup standing on table	1 stapler, 1 glass lying on table
3.1	2 silver knives, 1 plate lying, 2 cups standing on table	2 silver knives, 1 plate standing, 2 cups standing on table	2 silver knives, 1 plate lying, 2 cups lying on table	2 silver knives, 1 plate lying, 1 cup standing on table	2 silver knives, 1 plate standing, 2 blue cups standing on table	3 silver knives, 1 plate lying, 2 cups standing on table
3.2	1 glass standing, 3 gums lying, 1 plastic bowl lying on table	1 glass lying, 3 gums lying, 1 plastic bowl lying on table	1 glass standing, 3 gums lying, 1 plastic bowl standing on table	1 blue glass standing, 3 gums lying, 1 plastic bowl lying on table	1 glass lying, 2 gums lying, 1 plastic bowl lying on table	1 glass standing, 3 gums lying, 2 plastic bowls lying on table

There were two picture series within each set. Each picture series consisted of one original picture and five alternate pictures, which were designed so as to vary from the original picture in one or more ways. Alternate pictures could differ from the original in position, colour, number, type of figure, material and ground.

In the first picture series in set 1, for instance, the original picture showed one type of object, a cup, in a lying position on a table. Alternate picture 1 showed the same object on the same ground, yet in a different position: standing. In alternate picture 2 all attributes were the same, except for the colour of the cup, which was blue instead of white. Alternate picture 3 and 4 differed from the original picture only with respect to the type of ground shown in the picture, namely the floor and the couch instead of the table. Alternate picture 5 showed two white cups standing on the table, thus it differed in number of figure from alternate picture 1.

2.3 Procedure

The two different tasks, classification and memorization, were put together in one questionnaire. The memorization task followed the classification task, as the latter was thought to be easier than the former. For the memorization task, different pictures were used than for the classification task so that none of the pictures would already be familiar to the participants. The first few questions were demographic in kind. Participants were asked to fill in their age, native language, nationality and gender. The next block of questions formed the

classification task, in which participants were shown one original picture and two alternate pictures. They then had to select the alternate that was most like the original picture. A more detailed description of the classification task can be found in section 2.5.3.

The memorization task contained six questions about pictures and three about pieces of text which functioned as distractors. The participants were first shown one original picture for ten seconds. They were then told to read a piece of text for 20 to 60 seconds. Following this piece of text, they had to answer a question which was either about the picture or about the piece of text. The participants were asked which picture from the six alternates that were shown was the original picture. If the question was about the piece of text, the participants were asked which sentence out of the four options occurred in the text. A more detailed description of the memorization task can be found in section 2.5.3.

2.4 Questionnaire

In this section the making and the distribution of the questionnaire will be discussed in detail. A pilot study was carried out first for several reasons, which will be listed below. Any changes made to the questionnaire after the pilot study was carried out are also explained below.

2.4.1 Qualtrics

The questionnaire was made by using Qualtrics, a program which is freely available via the website of Leiden University. It was selected because of its easy accessibility and many useful features, the availability of which was vital to carrying out my research successfully. Qualtrics also offers online Support and Training programs, which can be accessed at any time and provide useful information on any feature that is available.

2.4.2 Pilot questionnaire

The decision to carry out a pilot questionnaire was made for several reasons:

(1) In order to make sure that the questionnaire was of an adequate length with respect to the gathering of enough research material and the amount of time it took for the participants to fill it in.
(2) In order to ascertain if the questions and assignments were clear to the participants.
(3) In order to see whether the results of the pilot would yield enough information in order to test the research hypotheses.

Three Dutch participants who had no previous knowledge about the topic of the questionnaire were asked to fill it in. They took 10, 12 and 22 minutes to fill it in, which is roughly what was expected, as the respondents were told the questionnaire would approximately take between 15 and 20 minutes. At the end of the questionnaire the respondents had the opportunity to write down any comments they might have about the experiments. None of the respondents indicated that tasks were too simple/complicated/vague, that the questionnaire was too long, or that the program malfunctioned in any way.

The results that were obtained provided enough information so as to ensure that the research hypotheses were testable. One question was added to the demographical questions, namely what the nationality of the participant was. This was done in order to distinguish between several kinds of native English speakers, for instance, American, British, Australian or Singaporean English.

On the basis of the answers that were given for the classification task it was decided that a couple of triads should contain timers that would record how long participants took before answering a question. This was done because the participant who had taken over 20 minutes to finish the pilot questionnaire had answered a significant number of questions differently than the other two participants who finished the pilot in 10 and 12 minutes respectively. The first and last triads were timed, and so were a few triads that occurred in the middle of the questionnaire. This was done in order to be able to compare the results and find out whether participants increased their speed towards the end of the questionnaire, and whether the answers of slow-answering participants were indeed significantly different from fast-answering participants.

It appeared that the three levels of difficulty in the memorization task all yielded important information. Level 1 pictures contained only one type of object, level 2 contained two types of object and level 3 contained three types of object. At least one of the participants made a mistake at each one of the levels, so it was decided that all three levels of difficulty would remain in the questionnaire.

Thus the pilot questionnaire provided some useful information which could be used for the real questionnaire. The complete pilot questionnaire was copied and distributed as the definitive questionnaire, except for the few additions that were described above. The next section provides a more in-depth description of the questionnaire.

2.4.3 Questionnaire

In order to make the questionnaire equally accessible to both target groups, it listed all questions both in English and in Dutch. The questionnaire consisted of three different parts. The first part contained four demographic questions which addressed the age, gender, nationality and native language of the participants. Only the latter variable was vital to the research, the other variables provided some additional information, which could be used later on to explain certain outcomes.

The second part of the questionnaire focused on the classification task. It contained 28 triads, twenty of which dealt with the subject matter of the research and eight of which functioned as distractors. Each triad appeared on a separate page, so the participants could not have another look at previous triads. In addition, there was no 'back' button so they could not go back and change previous answers. In this way I could be sure that all the answers to the questions were intuitive and not the result of extensive studying. This could also be ascertained via the timers that were put on some triads, which recorded the amount of time a participant spent answering the question. The timers were put on triads at the beginning, in the middle and at the end of the questionnaire. The eight triads which functioned as distractors were distributed at random.

The triads consisted of one original picture, which was shown at the top of the page, and two alternate pictures, which were shown side by side below the original. Following Lucy (1992b), the question that the participants had to answer was: 'Which picture is most like the picture above?' The question was formulated in this way so that it would in no way be clear for the participants on which ground they had to make their decision. The position of the alternate pictures was randomized, because it can be expected that participants who are used to reading from left to right would be unconsciously biased in favour of the picture on the left.

The third part of the pilot questionnaire consisted of nine questions that made up the memorization task. Six out of the nine questions dealt with the research matter, three questions were about the distraction material. The distraction questions were distributed over the pilot at random. The participants were told what to do by means of a short piece of introductory text. The first screen that the participants saw contained a picture which would be shown for ten seconds, after which the questionnaire would automatically move on to the next screen. This next screen contained a piece of text, both in English and Dutch, which the participants were instructed to read. They had between 20 and 60 seconds to read the piece of text. The 'next' button would only appear after 20 seconds, and the questionnaire would automatically move on to the next page after 60 seconds. This was done in order to make sure

that the participants would neither spend too little time reading the piece of text nor too long, as this could adversely affect the results of the questionnaire. Too little time would mean that they had selected an answer at random, and/or it would mean that they were not distracted long enough, so that the choice of the original picture from the six alternatives would become easier. Too much time would mean that they could use alternative devices to remember the text, such as taking a picture with a mobile phone or copying out (parts of) the text. On the next page the participants were asked a question, either about the piece of text that functioned as a distractor, or about the picture they had seen. In the former case the participants were asked the following question: 'Which sentence occurred in the text?' They were given four options to choose from, one of which was correct and three of which were sentences from the text that were slightly altered. The choice to provide only four alternatives, instead of six alternatives as with the pictures, was made because the answers were already so long that it would take the participants an inordinate amount of time to read as much as six alternative sentences. In the case of the picture, the following assignment was given: 'Choose the original picture, which you have just seen for 10 seconds, from this array of pictures.' The array of pictures consisted of six pictures, including the original picture. The five alternate pictures differed from the original in one or more of these respects: type of figure, type of ground, position, colour and number. This entire sequence, from the picture that was shown for ten seconds to the answering of the question, was repeated nine times. After this the questionnaire was completed and the participants were thanked for their participation. Any comments on the questionnaire could be left on this page as well.

2.5 Respondents

All of the respondents were asked to fill out the questionnaire via a personal email or message, which included the web link of the questionnaire. In this way the distribution of the questionnaire could be controlled. The questionnaire was closed after a couple of weeks, after which the web link was no longer accessible. The entire questionnaire can be found in Appendix 2. After deleting the answers of respondents who had indicated that they could not see some pictures, a total of 32 respondents remained. 17 were Dutch-speaking respondents and 15 were English-speaking respondents. Of the 32 respondents, 11 were male and 21 were female. The Dutch-speaking respondents all indicated to have a Dutch nationality, whereas the English-speaking respondents indicated to have the following nationalities: British, American, Singaporean and Australian.

2.6 Statistical analyses

Before moving on to the discussion of the results of the above described experiments, it is important to provide information on the statistical analyses that were performed in the present study. The results of all the tests were calculated by means of IBM SPSS Statistics Version 21. Because there was one independent variable, native language, and one dependent variable, position, it was decided to perform independent samples *t*-tests to calculate the results of both of the research experiments. To calculate whether any of the results were significant, a significance level of $\leq .05$ was maintained. Cohen's *d* was calculated for each independent samples *t*-test, which indicates effect size or strength of association. It indicates whether the association between the independent variable and the dependent variable is small, medium or large. Consequently, the larger Cohen's *d* is, the more significant the results are. In conjunction with the independent samples *t*-test, SPSS calculates the results for Levene's *F* test, which is used to calculate homogeneity or equality of variances. When homogeneity of variances is satisfied, it means that the samples collected from the two groups vary similarly, and can thus be used for research.

Chapter 3: Results

3.1 Introduction

This chapter will contain the results of the research experiments which have been carried out for this study. First, some general information on the demographical numbers will be given. Then I will move on to discuss the results of the first research hypothesis, addressed by the classification task. Lastly I will discuss the results of the second research hypothesis, which is addressed by the second research experiment that was carried out: the memorization task. The output of all the tests that were carried out can be found in Appendix 1.

3.2 Results research hypotheses

3.2.1 Demographics

Before moving on to a discussion of the results of the research experiments, it is important to provide information on the demographical numbers pertaining to the present study. As can be seen in Table 5, the youngest respondent to fill out the questionnaire was 18 years old, and the oldest was 41 years old. There were more females to fill out the questionnaire than men. The percentage of Dutch and English speakers was approximately equal. All of the Dutch-speaking respondents were in possession of a Dutch nationality. Most of the English-speaking respondents had a British nationality. The remainder of the English-speaking respondents had either an American, an Australian or a Singaporean nationality.

Table 5. *Demographic descriptives.*

Variable	
Age (range = 18-41)	*M* = 22.72 (*SD* = 4.39)
Gender	
Male	34,4%
Female	65,6%
Native language	
Dutch	53,1%
English	46,9%
Nationality	
American	3,1%
Australian	6,3%
British	34,4%
Dutch	53,1%
Singaporean	3,1%

3.2.2 Classification task

In this section the tests that have been carried out with the data from the classification task will be recounted in detail. The first test asked whether Dutch speakers would significantly more often classify the pictures according to position than English speakers, irrespective of the verb. The three following tests analyzed whether for one of the three cardinal posture verbs the results were more significant than for the other verbs.

In the first test, the group of Dutch speakers (N = 17) was associated with a positional classification M = 4.06 (SD = 3.733). The group of English speakers (N = 15) was associated with a numerically slightly higher positional classification M = 4.73 (SD = 3.882). An independent samples t-test was performed in order to test the hypothesis that speakers of Dutch were associated with a significantly higher mean positional classification number. As can been seen in Table 6, the Dutch-speaking and English-speaking distributions were normally distributed, hence a t-test could be conducted (i.e., skew <|2.0| and kurtosis < |9.0|; Schmider et al. 2010). Additionally, the assumption of homogeneity of variances was tested and satisfied via Levene's F test, $F(30) = .03$, $p = .874$. The independent samples t-test showed no statistically significant effect, $t(30) = -0.50$, $p = .620$. Thus, Dutch speakers did not choose for position as a basis for classification significantly more often than English speakers. Cohen's d was estimated at .176, which is a small effect based on Cohen's (1992) guidelines.

Table 6. *Descriptive Statistics associated with Native Language*

	N	*Mean*	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Native Language	32	1,4688	,131	,414	-2,119	,809
Valid N (listwise)	32					

Table 7 displays all of the statistics of the three different posture verbs. Independent samples t-tests were performed for the verbs, seeing as the conditions of the test, normal distribution and homogeneity of variance, were met with. For each of the three verbs the hypothesis was that speakers of Dutch were associated with a significantly higher mean positional response number. The independent samples t-tests showed no statistically significant effect for any of the verbs. Thus, speakers of Dutch did not choose for position as a basis for classification significantly more often than speakers of English. The effect size, Cohen's d, was small for each of the verbs, based on Cohen's (1992) guidelines.

Table 7. *Statistics classification task*			
	Staan	*Liggen*	*Zitten*
Dutch speakers (*N*), *M, SD*	*N* = 17, *M* = 1.82, *SD* = 1,510	*N* = 17, *M* = 1.82, *SD* = 1.879	*N* = 17, *M* = 0.41, *SD* = 0.618
English speakers (*N*), *M, SD*	*N* = 15, *M* = 2.07, *SD* = 1.792	*N* = 15, *M* = 2.20, *SD* = 1.859	*N* = 15, *M* = 0.47, *SD* = 0.640
Levene's *F* test	*F*(30) = .11, *p* = .739	*F*(30) = .002, *p* = .961	*F*(30) = .076, *p* = .785
Independent samples *t*-test	*t*(30) = -0.42, *p* = .680	*t*(30) = -0.57, *p* = .574	*t*(30) = -0.25, *p* = .807
Cohen's *d*	.151	.203	.095

None of the three different cardinal posture verbs displayed a significant effect. The significance levels of the three cardinal posture verbs are displayed in Table 8. As the Cohen's *d* numbers indicated, native language has only a small to very small effect on the choice for position as a basis for classification.

Table 8. *Significance levels for cardinal posture verbs*	
Verb	**Significance**
Staan	0.680
Liggen	0.574
Zitten	0.785

3.2.3 Memorization task

In this section the results from tests that have been done with the data from the memorization task will be outlined. The first test asked whether speakers of Dutch were significantly better at remembering the original picture after having been distracted for a period of time. The second test was conducted to provide more in-depth information as to the kind of mistakes that were made by both Dutch and English speakers. It tested whether speakers of English made significantly more positional mistakes than speakers of Dutch.

In the first test, the group of Dutch speakers (*N* = 17) was associated with a correct response *M* = 5.06 (*SD* = 0.899). By comparison, the group of English speakers (*N* = 15) was associated with a numerically slightly lower correct response *M* = 5.00 (*SD* = 0.926). To test the hypothesis that speakers of Dutch were associated with statistically significantly higher mean correct response numbers, an independent samples *t*-test was performed. The same group of speakers was used for this experiment as for the classification task which was described above, which means that, the Dutch-speaking and English-speaking distributions were sufficiently normal for the purposes of conducting a *t*-test. Additionally, the assumption of homogeneity of variances was tested and satisfied via Levene's *F* test, *F*(30) = .56, *p* =

.460. The independent samples *t*-test showed no statistically significant effect, $t(30) = .18$, $p = .857$. Thus, Dutch speakers did not memorize the original picture significantly better than English speakers. Cohen's *d* was estimated at .0647, which is a small effect based on Cohen's (1992) guidelines.

For the second test, the group of Dutch speakers ($N = 17$) was associated with a positional error $M = 0.47$ ($SD = 0.717$). By comparison, the group of English speakers ($N = 15$) was associated with a numerically higher positional error $M = 0.67$ ($SD = 0.900$). To test the hypothesis that speakers of Dutch were associated with statistically significantly lower mean positional errors, an independent samples *t*-test was performed. As the same groups of speakers were used for this test, the same level of skewness and kurtosis apply, which means that the Dutch-speaking and English-speaking distributions were sufficiently normal for the purposes of performing a *t*-test. Additionally, the assumption of homogeneity of variances was tested and satisfied via Levene's *F* test, $F(30) = 2.38$, $p = .1330$. The independent samples *t*-test was not associated with a statistically significant effect, $t(30) = -0.69$, $p = .498$. Thus, speakers of English did not make significantly more positional errors than speakers of Dutch. Cohen's *d* was estimated at .2474, which is a small effect according to Cohen's (1992) guidelines. The next chapter will concern itself with discussing the results that were obtained in the present study.

Chapter 4: Discussion

4.1 Introduction

This chapter will build on the results that were outlined in the previous chapter by discussing the main findings of the two research experiments. It will also compare the results of the experiments with similar research that has previously been carried out. Most importantly, section 4.4 will discuss all aspects of the present study and comment on how they might have influenced the findings.

4.2 Main findings

This section will provide a summary of the findings of the two research experiments that were carried out in the present study. For the first experiment, the classification task, four independent samples *t*-tests were performed. The first *t*-test, which investigated whether on the whole Dutch respondents would significantly more often classify the pictures according to position, proved that there was no significant effect of native language on the classification of pictures. The remaining three *t*-tests all focused on a particular cardinal posture verb. These tests showed that, for all of the verbs, there was no significant effect of native language on the classification.

For the second experiment, the memorization task, two independent samples *t*-tests were performed. The first test investigated whether English speakers would make significantly more mistakes in choosing the correct original picture from the six alternates. This turned out not to be the case, as both English and Dutch speakers made approximately the same number of mistakes. The second test focused on the type of mistake made by the respondents. It tested whether speakers of English were prone to make significantly more position errors than speakers of Dutch. Again, this turned out not to be the case.

For all of the independent samples *t*-tests that were performed, the effect size or strength of association between the independent variable, native language, and the dependent variable, position, was small to very small, according to Cohen's (1992) guidelines. Thus, none of the experiments yielded significant results, which might be explained by several factors which will be discussed in the next sections.

4.3 Comparison with other research

In this section the results, which were summarized above, will be put into the perspective of other research that has been done previously. The research experiments that were employed in

the present study were inspired by Lucy (1992). In the case of the classification task, the experiments differed in the attributes that the respondents had to choose between. In the present study, the attributes were related to the objects, whereas in Lucy (1992) the attributes were intrinsic to the object. In Lucy's (1992) case the respondents had to choose between shape and material, whereas in the present study, respondents had to choose between position and figure or ground, depending on the triad. The results of Lucy's experiments supported the hypotheses that English speakers would more often classify according to shape than Yucatec speakers. Thus, a correlation was found between the grammar of both languages and the classification preferences. In the case of the memorization task, the experiments in the present research and in Lucy (1992) were similar to a very large extent. Lucy (1992) was able to conclude that speakers of English did in fact memorize number and shape significantly better than speakers of Yucatec.

On a more holistic level, this study investigated the linguistic relativity hypothesis, which has been supported in the research of many scholars, some of which have been mentioned in section 1.2.3. All their results will not be repeated here, but suffice it to say that ample evidence has been found that a correlation between language and cognition exists. However, there are some scholars who have provided some alternative hypotheses, especially in the domain of spatial reasoning. Li and Gleitman (2002) have conducted an experiment in which the participants' choice for FoR depended on the landmark cues that were provided, which led them to claim that "linguistic systems are merely the formal and expressive medium that speakers devise to describe their mental representations and manipulations of their reference world" (Li and Gleitman 2002: 290). Li et al. (2011) followed up on this by stating that "people's ability to think about where objects are located and how they move through space" is the same across languages (Li et al. 2011: 51). They further claim that populations use certain spatial language because it enables them to describe their environment best (Li et al. 2011: 51). This claim is further substantiated by Gleitman and Papafragou (2012), who have stated that language "offers an alternative, efficient system of encoding, organizing, and remembering experience", making language a tool that structures thought (Gleitman and Papafragou 2012: 20). The next section will have the aim of discussing these claims in the light of the present study.

4.4 Discussion

This section will discuss the results of the present study with respect to earlier research, and it will simultaneously offer possible explanations for the results that were obtained in the

present study. First of all it is important to note that, while the present study did not find any significant differences between English and Dutch, it is possible that the results would be radically different if other material or research experiments were used. Thus it is possible that with some alterations to the present study, subsequent studies could yield different results. In this section I will provide some plausible explanations for the results that were obtained in this specific study.

Building on the previous section, it can be said that, although the research calling into question the linguistic relativity hypothesis primarily dealt with spatial reasoning, some of the basic critiques are relevant to the present study. Li and Gleitman (2002) started by testing the spatial reasoning abilities of the participants and found that they were equal across populations. The present study did not test whether speakers of Dutch and English were equally adept at classifying according to only one attribute, but it is safe to assume that when given the task of classifying according to position, the groups of speakers would have tested equally well. Thus, this is in line with what Li et al. (2011) found.

The claim that Gleitman and Papafragou (2012) make, that language intrudes into nonlinguistic tasks, can be said to be true for the present research as well. The respondents were given on-screen verbal instructions as to what was expected of them, and however similar the Dutch and English instructions would seem, it is by no means certain that they are semantically identical. In addition, it is likely that the respondents have made use of language in storing the information they saw on the screen, in order to better memorize it. Thus, the "language-on-language effect" that Gleitman and Papafragou discuss in their article may play a role in the present study as well (Gleitman and Papafragou 2012:20). It is difficult to ascertain, however, in how far this has affected the results of the experiments, but it is certainly possible that it has. For instance, on seeing a picture, English respondents could have made a kind of mental note saying *The plate is lying on the table*, which means that they could have structured their thoughts by means of language.

As in virtually every research paper, some methodological shortcomings were detected after the experiments had been carried out, which have possibly adversely affected the results of the study. The software that was used for this study appeared not to be able to cope with the number of pictures that were inserted into the questionnaire. One of the respondents remarked that Qualtrics loaded the original picture first, making it easy to select the correct answer, even though the order of the answers was randomized. It is, however, difficult to ascertain how much credence should be given to what respondents say after having filled out the questionnaire. There were several respondents who indicated that the right answer was

always in the same spot, which is not possible because of the randomization. As such it is possible that respondents only thought the correct answer to be always in the same spot or to have loaded first, while this was not actually the case. There were also some respondents who indicated that they could not see several pictures, so their answers were taken out before the calculation of the results. These methodological issues might have influenced the results of the experiments and thus led to an incorrect rejection of the research hypotheses.

The present study did not result in any statistically significant effect of native language on position. However, as can be seen from the Cohen's *d* numbers, there is a small effect of native language on position, which means that other factors must have caused the results to be not significant. One other variable that could have influenced the results is, as outlined above, the "language-on-language effect" (Gleitman and Papafragou 2012: 20). The fact that the respondents might have "appealed to language … to help them complete [the] task" explains why it is difficult if not impossible to keep linguistics out of the experiments (Everett 2013: 67). If it is the case, should not English and Dutch respondents have significantly differed in their given answers, seeing as the linguistic difference should have become even more prominently present?

The most important and far-reaching explanation for the rejection of the hypotheses has to do with the first step in research into linguistic relativity: "Identify a difference between two languages, in sound, word, or structure" (Gleitman and Papafragou 2012: 19). Ameka and Levinson (2007) have classified English as a "Type I" language, meaning that it employs "a single locative verb" in denoting the position of objects (Ameka and Levinson 2007: 863). Dutch is classified as a "Type II" language, meaning that it employs "a small contrastive set of locative verbs" for locating objects in space (Ameka and Levinson 2007: 864). However, it is my opinion that English and Dutch do not differ sufficiently with respect to the use of posture verbs in order for it to be salient. The fact is that the three verbs (*to stand*, *to lie* and *to sit*) exist and are used in contexts pertaining to locating objects. It is true that in the present simple, they are often disregarded in favour of the neutral verb *to be*, but they are used in the past simple, the present continuous and the past continuous. Thus, the saliency of the difference between English and Dutch with respect to posture verbs can be called into question. If there is indeed less of a salient difference between the two languages in this respect, then the question raised in the previous paragraph can be answered with a decisive 'no'. If the first step in the research into linguistic relativity turns about to be questionable, then the whole research will be affected by this. It is not surprising, therefore, that the present research has not yielded the expected answers.

When looking at the present study from an entirely different perspective, it can also be said that the Dutch language is to blame. Croft (2001) has proposed that when a language has only one way of saying something, then that is the conventional way, which does not necessarily need to be conceptualized by the speakers of the language. In Dutch, the three posture verbs might have conventionalized to such an extent that speakers of the language do not conceptualize them anymore. This means that they use the different posture verbs, but they do not link them to the actual position of the object in the picture. Thus, the convention of use precludes the transparency of the semantics. If the language then does not inspire the speaker to conceptualize the expression, then it is impossible for the language to influence the speaker's way of thinking, making the rejection of the linguistic relativity hypothesis inevitable.

Chapter 5: Conclusion

5.1 Introduction

The final chapter of the present study will offer a conclusion of all that was written down in the previous chapters. It will refer to the research hypotheses that were constructed in chapter 1 and it will answer the research question. Some limitations of the present study will be listed as will some suggestions for further research.

5.2 Conclusion

To conclude the present paper, all of the research hypotheses will be listed and commented on below, as well as the research question.

1. Speakers of Dutch will significantly more often classify pictures according to spatial position than speakers of English.
2. Speakers of Dutch will be able to remember the position of objects in pictures significantly better than speakers of English.
3. From all of the mistakes that will be made, speakers of Dutch will make significantly less positional mistakes than speakers of English.

The first research hypothesis was rejected, as the independent samples *t*-tests pointed out that speakers of English and Dutch classified according to spatial positions approximately equally often. Hypothesis number 2 was rejected because the statistical tests showed that speakers of English and Dutch had an approximately equal ability to remember the correct picture. The final hypothesis was rejected as well, as there was no significant difference between speakers of English and Dutch with respect to the number of positional mistakes that were made.

In section 1.4, the research question was formulated as follows:

Does the difference in posture verbs used for locating inanimate objects in English and Dutch influence speakers' thoughts about inanimate objects?

The shortest possible answer to this question, building on the rejected hypotheses, is 'no'. The present study has yielded results that indicate that speakers of Dutch do not classify pictures according to position significantly more often than speakers of English, and neither are they significantly better at memorizing the position of objects. As can be read in the discussion in

section 4.4 above, it can be called into question whether Dutch really has a more diverse lexical field than English with respect to posture verbs, as the English language does have the three distinct verbs and they are used, although less often than in Dutch. Thus, the two languages do not differ enough in the domain of posture verbs, which is why there was no significant influence of language on thought found in the present study. Another possible explanation which was offered in the previous chapter is that of conventionalization. If the Dutch use of posture verbs has conventionalized to such an extent that speakers do not conceptualize the posture verbs, then the posture verbs cannot influence the speakers' way of thinking.

5.3 Limitations of research

This section will list some of the limitations of the present study. A methodological shortcoming is the program which was used for the questionnaire: Qualtrics. Although the program offers the option to randomize the order of the answers, some respondents had their doubts about the randomization and the order in which the pictures loaded. One respondent pointed out that the correct picture always loaded first. It is impossible to ascertain afterward whether this was indeed the case or if the respondents was just imagining it. This uncertainty can be avoided by not entering the correct answer into the first answer slot in the program, but to alternate the correct answer slot, or by supervising all the respondents while they fill out the questionnaire, so that any discrepancies with the program can be monitored.

Only two languages were used for the present study, English and Dutch, and both of these languages are from the same language family: Indo-European, and more specifically: West-Germanic. These languages sufficed for the purposes of a master's thesis, but a look at additional languages from other language families would have been beneficial to the study. In addition to this, the present study only made use of two distinct research experiments. More and various other experimental tasks could have been added in order to gain more comprehensive and reliable results on which to base the conclusions.

5.4 Suggestions for further research

This final section will offer some suggestions as to further research in the field of posture verbs. Apart from the improvement of the methodological shortcomings that were listed in the previous paragraph, several other changes and improvements can be made in order to advance the quality of the research that is being done. First and foremost, more research into how different English and Dutch are with respect to the usage of cardinal posture verbs is

necessary. Based on the present study, it seems as though the two languages do not differ greatly, except maybe in usage preferences, but this needs to be further investigated. As both of the research experiments seemed reliable, they can be used to investigate other languages with respect to posture verbs. It is recommended that those languages are not too similar, as opposed to English and Dutch, which were a Type I and a Type II according to Ameka and Levinson (2007). A more diverse set of languages from several different language families will more clearly establish whether language can influence thought when locating inanimate objects in space. Also, more research can be done in order to ascertain whether speakers of Dutch still consciously associate the posture verbs they use with the actual position of the object, or whether the use of posture verbs has truly become a convention that does not inspire any conceptualization anymore.

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Appendices

Appendix 1: SPSS output

Classification task

```
T-TEST GROUPS=Native_Language(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=SLZ_PGF_P
  /CRITERIA=CI(.95).
```

T-Test

```
[DataSet1] /Users/frederiquevankrugten1/Library/Mail
Downloads/MA_thesis_classificationtask.sav
```

Group Statistics

	Native_Language	N	Mean	Std. Deviation	Std. Error Mean
SLZ_PGF_P	Dutch	17	4,06	3,733	,905
	English	15	4,73	3,882	1,002

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
SLZ_PGF_P	Equal variances assumed	,025	,874	-,501	30	,620	-,675	1,347	-3,426	2,077
	Equal variances not assumed			-,499	29,173	,621	-,675	1,351	-3,436	2,087

```
T-TEST GROUPS=Native_Language(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=Staan_PGF_P
  /CRITERIA=CI(.95).
```

T-Test

```
[DataSet1] /Users/frederiquevankrugten1/Library/Mail
Downloads/MA_thesis_classificationtask.sav
```

Group Statistics

	Native_Language	N	Mean	Std. Deviation	Std. Error Mean
Staan_PGF_P	Dutch	17	1,82	1,510	,366
	English	15	2,07	1,792	,463

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Staan_PGF_P	Equal variances assumed	,113	,739	-,417	30	,680	-,243	,584	-1,435	,949
	Equal variances not assumed			-,412	27,571	,683	-,243	,590	-1,452	,966

```
T-TEST GROUPS=Native_Language(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=Liggen_PGF_P
  /CRITERIA=CI(.95).
```

T-Test

```
[DataSet1] /Users/frederiquevankrugten1/Library/Mail
Downloads/MA_thesis_classificationtask.sav
```

Group Statistics

	Native_Language	N	Mean	Std. Deviation	Std. Error Mean
Liggen_PGF_P	Dutch	17	1,82	1,879	,456
	English	15	2,20	1,859	,480

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Liggen_PGF_P	Equal variances assumed	,002	,961	-,568	30	,574	-,376	,662	-1,729	,976
	Equal variances not assumed			-,569	29,580	,574	-,376	,662	-1,729	,976

```
T-TEST GROUPS=Native_Language(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=Zitten_PGF_P
  /CRITERIA=CI(.95).
```

T-Test

```
[DataSet1] /Users/frederiquevankrugten1/Library/Mail
Downloads/MA_thesis_classificationtask.sav
```

Group Statistics

	Native_Language	N	Mean	Std. Deviation	Std. Error Mean
Zitten_PGF_P	Dutch	17	,41	,618	,150
	English	15	,47	,640	,165

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Zitten_PGF_P	Equal variances assumed	,076	,785	-,247	30	,807	-,055	,223	-,510	,400
	Equal variances not assumed			-,246	29,218	,807	-,055	,223	-,511	,401

Memorization task

```
T-TEST GROUPS=NativeLanguage(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=Correct
  /CRITERIA=CI(.95).
```

T-Test

```
[DataSet1] \\VUW\Personal$\Homes\10\s1021745\My
Documents\Thesis\SPSS\MA_thesis_memorizationtask.sav
```

Group Statistics

	NativeLanguage	N	Mean	Std. Deviation	Std. Error Mean
Correct	Dutch	17	5,06	,899	,218
	English	15	5,00	,926	,239

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Correct	Equal variances assumed	,561	,460	,182	30	,857	,059	,323	-,601	,718
	Equal variances not assumed			,182	29,266	,857	,059	,324	-,603	,720

```
T-TEST GROUPS=NativeLanguage(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=Incorrect_Position
  /CRITERIA=CI(.95).
```

T-Test

```
[DataSet1] \\VUW\Personal$\Homes\10\s1021745\My
Documents\Thesis\SPSS\MA_thesis_memorizationtask.sav
```

Group Statistics

	NativeLanguage	N	Mean	Std. Deviation	Std. Error Mean
Incorrect_Position	Dutch	17	,47	,717	,174
	English	15	,67	,900	,232

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Incorrect_Position	Equal variances assumed	2,381	,133	-,685	30	,498	-,196	,286	-,780	,388
	Equal variances not assumed			-,676	26,748	,505	-,196	,290	-,792	,400

Appendix 2: Research questionnaire